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THE
VICTORIAN NATURALIST:
Field Naturalists' Club of Victoria.
THE JOURNAL & MAGAZINE
OF THE

VOL. XXIX.

MAY, 1912, TO APRIL, 1913.

Hon. Editor: MR. F. G. A. BARNARD.

The Author of each Article is responsible for the facts and opinions recorded.

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THE VICTORIAN NATURALIST.

VOL. XXIX.

MAY, 1912, to APRIL, 1913.

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ERRATA.

- Page 12, line 13—For "XXV." read "XXXV."
- Page 12, line 29—For "XXIX." read "XXXIX."
- Page 12—After line 33 insert "Plate XLIV.—*Cerithia cœrulea*."
- Page 113, line 1—For "*C. silicifolia*" read "*C. filicifolia*."
- Page 113, line 3—For "*albiflora*" read "*albidiflora*."
- Page 113, line 5—For "*Leptorrhynchus*" read "*Leptorrhynchos*."
- Page 114, line 26—After "*gibbosus*" read "*Scapholeberis kingi*
(*Daphnia mucronata*, King)."
- Page 114, line 27—Omit "*Scapholiberis?*" and for "*globosa*" read
"*tenuicornis*."
- Page 114, line 28—For "*Chydorus*, sp." read "*Chydorus globosa*."
- Page 114, line 34—For "*Janirilla*" read "*Janirella*."
- Page 174, line 28—For "*Ilyoeglyptus*" read "*Ilocryptus*."
- NOTE.—On cover of No. 8 (December, 1912) "Vol. XXX." should
read "Vol. XXIX."

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VOL. XXIX.—No. 1.

MAY 9, 1912.

No. 341.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 15th April, 1912.

The president, Mr. F. Wisewould, occupied the chair, and about 70 members and visitors were present.

CORRESPONDENCE.

From Dr. A. J. Ewart, the Club's representative on the Wilson's Promontory National Park Committee, stating, in reply to an inquiry by the secretary of the Club, that the calling for tenders for agistment of cattle in the Park did not mean any departure from rule or custom; that the main source of revenue to enable improvements, &c., to be made was the grazing of cattle; that cattle grazing were not so injurious (as weed transporters) as horses; and that for the present the committee considered the cattle necessary both as a source of revenue and as track-makers; but that any views which the Field Naturalists' Club would be pleased to express would be placed by him before the next meeting of the committee.

Messrs. J. A. Leach, M.Sc., W. F. Gates, M.A., George Coghill, and other members discussed the question, and expressed the opinion that the sanctuary should not be encroached on by introduced animals other than were necessary for haulage, &c., and that all possible sources of fire should be eliminated as much as possible.

Mr. J. A. Kershaw, F.E.S., hon. secretary of the National Park Committee, explained the position of the committee and their need of revenue and of tracks to the recesses of the mountainous country, which were kept open by the cattle, thus allowing better survey and supervision.

After considerable discussion, it was resolved, on the motion of Messrs. Coghill and Leach, that the Club enter a protest against any further grazing in the Park.

REPORTS.

A report of the excursion to Coode Island on Saturday, 23rd March, under the leadership of Messrs. J. R. Tovey and C. French, jun., was read by Mr. Tovey, who reported a good attendance of members. Four additional exotic plants were recorded, and reference made to other points of interest. Mr. R. W. Armitage, M.Sc., remarked that Coode Island formed a good collecting-ground for junior geologists and others, who would find in the ballast refuse there rock specimens from many parts of the world, and otherwise difficult to obtain.

A report of the excursion to Flemington Bridge on Saturday, 13th April, for geology, which was to have been led by Mr. J. S. Kitson, but who, at too late a date to provide a substitute, forwarded an apology for non-attendance owing to his being required for military duty, was given by Mr. A. L. Scott, who stated that a party of members visited the Royal Park railway cutting, a favourite locality for geologists for years past, and were delighted to find that, owing to the re-dressing of the cutting by the Railway Department, new faces had been made and geological exposures of greater stratigraphical value than the old ones made evident. Mr. J. L. Robertson, M.A., said that, while he regretted the absence of the promised leader, it was due to Mr. Scott to say that he had proved himself a very able and entertaining instructor on this as on other occasions.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Walter Zumstein, Wartook, was duly elected as a country member.

[At this stage the president requested Mr. J. A. Kershaw, F.E.S., one of the vice-presidents, to take his place, owing to his having to attend an important meeting elsewhere.]

GENERAL BUSINESS.

Mr. F. G. A. Barnard, as the Club's representative on the council of the National Parks Association, drew attention to the visit to the You Yangs on Friday, 19th April, in order to be present at the unveiling of a memorial tablet to the memory of Flinders on Station Peak.

Mr. J. Searle said that an excellent illustrated handbook of the orchids of South Australia had been published by the South Australian Education Department, which he thought would be useful to local lovers of that group of plants.

PAPER READ.

By Mr. G. A. Keartland, entitled "Remarks on the Quail Season, 1912."

The author prefaced his remarks on the quail by saying that he had regarded his paper of last year as his last word, but that criticisms which attempted to show that his opinions had been founded on an abnormal season (1911) made it necessary for him, in response to the appeal of many fellow-members, to comply by relating his experiences in the field during the opening of the last season. He then proceeded to show that 1912 was even a worse year for the protection of quail than 1911 had been. His views were placed before the Club not only as those of a naturalist but also of a sportsman.

In the discussion which followed, Mr. J. A. Leach hoped that Mr. Keartland would persevere in his laudable effort to get better conditions for native game, and said that the Club was

fortunate in having him as an enthusiastic champion in the cause.—

NATURAL HISTORY NOTES.

Mr. T. S. Hart, M.A., mentioned having noted bipinnate leaves on young *Acacia oxycedrus*, which had sprung up after a fire on heathy ground, and remarked that this species and *A. pycnantha* had already formed their buds for next season, with almost a six months' wait ahead. He also noticed that in the common heath, *Epacris impressa*, a reddish colour was developed in the upper surface of the leaves; but where a branch had become broken and bent down, thus exposing the under side of the leaves to the light, it was the under surface which became red.

Mr. R. W. Armitage, M.Sc., stated that he had recently noticed the unusual occurrence of dense swarms—collected like bees—of Crane-flies, of the family Tipulidæ, sheltering on the lee side of tree trunks at the foot of the slopes of Mount Macedon. When disturbed the insects scattered, but quickly gathered together again.

Mr. Spry said this was a common phenomenon in mountain gullies.

Mr. J. A. Kershaw mentioned that some further introductions had been made to the National Park—viz., 27 opossums, several lyre-birds, two kinds of Bass Strait wallaby, and also the Flinders Island wombat. He added that the wild duck were becoming very tame, and were breeding well, and that the quail had settled to a life of comparative security and peace.

EXHIBITS.

By Mr. R. W. Armitage.—Small volcanic bombs from Mount Porndon, near Pomborneit, between Colac and Camperdown: specimens of three kinds of gneiss, two of which are garnetiferous, collected at Coode Island, where they had been deposited after having been brought as ships' ballast from overseas; a pot-hole stone, about six inches in diameter, found at a depth of 40 feet in an alluvial lead at Steel's Creek, near Yarra Glen; specimens of Crane-flies, *Dolichopeza longifurca* (?), Skuse, noticed clustering in great numbers in the Macedon district on 5th March last; skin of Three-striped Opossum, *Dactylopsila trivirgata*, from east coast of Papua.

By Mr. J. E. Dixon.—Coleoptera from Rockbank, Sea Lake, and Portland, including the new variety (*viridimicans*) of *Sarticus obesus*, found by exhibitor and named by Mr. T. G. Sloane.

By Mr. C. J. Gabriel.—Thirteen species of chitons recently collected at Torquay, Victoria—viz., *Chiton jugosus*, Gld., *C. tricostalis*, Pils., *Ischnochiton virgatus*, Roe, *I. ustulatus*, Roe, *I. novae-hollandiae*, Roe, *I. cariosus*, Pils., *I. resplendens*, Bed.

and Mthws., *I. crispus*, Roe, *I. contractus*, Roe, *Acanthochites variabilis*, Ad. and Ang., *A. retrojectus*, Pils., *Plaxiphora petholata*, Sow., and *Cryptoplax striatus*, Lam.; also specimens of *Sepia apama*, Gray, and *S. braggi*, Verco.

By Mr. P. R. H. St. John.—Herbarium specimens (in various stages), showing buds, fruit, mature and sapling foliage, also seedlings, of *Eucalyptus delegatensis*, R. T. Baker (1900), Woolly-butt, collected by exhibitor at Mount Donna Buang, 31st March, 1912, not previously recorded as found growing so near Melbourne (42 miles); also specimens of *Persoonia arborea*, F. v. M. (Proteaceæ), "Tree Geenburg," from same locality.

By Mr. J. R. Tovey.—Dried specimens of *Abutilon indicum*, Sweet (Malvaceæ), Indian Lantern-flower, a native of the tropical regions, also found in South Africa; *Aizoon rigidum*, L., var. *angustifolium*, Sond. (Ficoideæ), Rigid Aizoon, indigenous to South Africa; *Hermannia velutina*, D.C. (Sterculiaceæ), Velvet Hermannia, indigenous to South Africa; *Mercurialis annua*, L. (Euphorbiaceæ), Annual Dog's Mercury, a native of Europe and Africa, a troublesome weed in gardens, containing a substance which turns the leaves, when drying, to the colour of indigo blue, and gives the milk of cows feeding upon it a bluish tinge—all collected at Coode Island on the occasion of the Club excursion, 23rd March, 1912, and new introductions to Victoria; specimen of *Leptospermum lavigatum*, F. v. M., Coast Tea-tree, found flowering at Mentone, 28th March, 1912.

After the usual conversazione the meeting terminated.

SOME ACACIA NOTES.—During a ramble near Clayton a few days ago I noticed the young shoots of an *Acacia oxycedrus*, springing from the bases of burnt plants, showing true leaves —i.e., the bipinnate form. Near Ballarat *A. stricta* has been observed to carry a few true leaves on suckers springing up after a fire. In seedlings a gradual change in foliage is well seen in *A. pycnantha*, and a more abrupt change in foliage and simultaneously in style of growth in *A. verticillata*. Many acacias are also remarkable for the slow development of their flower-buds; thus *A. pycnantha* in my garden at Sebastopol carries recognizable flower-buds in December each year, the flowers not opening till the following September (one or two stray flowers have opened as early as 30th June). *A. oxycedrus* can be seen in bud in the heath country about Caulfield at least as early as February, though not flowering till August or September. At the Creswick State Forest in March the buds of *A. dealbata* were well advanced, but it will be about the end of July before they are fully developed.—T. S. HART, Ballarat.

EXCURSION TO COODE ISLAND.

INTERESTED by the remarks on the flora, &c., of Coode Island in the *Naturalist* for July last (*Vict. Nat.*, xxviii., p. 57), a party of eighteen boarded the motor boat at Queen's Bridge on Saturday afternoon, 23rd March, *en route* to the island. Shortly after arrival there two more members joined the party. All expressed surprise at the large amount of foreign vegetation that was growing there. It was noted that most of the plants found flowering there during previous trips made by the leaders in such periods of former years as October to December, also June, were found in flower, thus evidently showing that the exotic plants had not as yet settled down to our seasons. It was also pointed out that, whilst the foreign shells collected there were mostly of North American origin, the plants were mostly South African, and in a few instances European or Asiatic, but none of North American origin, thus showing that the North American ballast came from the seashore, and that from South Africa apparently from further inland.

About twelve plants which are either recognized as native or naturalized aliens in other parts of the State, but not previously recorded for the island, were collected. Amongst these might be mentioned a variegated form of the Red Goosefoot, *Chenopodium rubrum*, L., and the Caltrops, *Tribulus terrestris*, L. Four species not previously recorded as introduced in Victoria were obtained—*i.e.*,

Mercurialis annua, L., Annual Dog's Mercury, Euphorbiaceæ; a native of Europe and North Africa.

Aizoon rigidum, L., var. *angustifolium*, Sond., Rigid Aizoon. Ficoideæ; indigenous to South Africa.

Hermannia velutina, D.C., Velvet Hermannia, Sterculiaceæ; another stranger from South Africa.

Abutilon indicum, Sweet., Indian Lantern-flower, Malvaceæ; a native of the tropical regions, also found in South Africa. Two other apparently new introductions were found, but these, unfortunately, were without fully developed flowers or fruit, and could not as yet be fully determined. Altogether, fully fifty species were noted in flower, notwithstanding the dry season.

Insects were exceedingly scarce. The only species found were the introduced carab beetles, *Læmostenus complanatus* (which were found under the stones), two species of the longicorn Hebecerus, and several other common beetles; some larvae of the salt-marsh mosquito, *Culex labeculosus* were collected; and a few specimens of the rare scale-insect, *Pulvinaria salicorniae*, were found on the salicornia bushes. A White-lipped Snake, *Denisonia coronoides*, and several small lizards, *Tympanocryptis lineata*, were also noticed.

Mr. R. W. Armitage has kindly handed us the following

notes on the foreign rocks, brought as ballast, noticed during the afternoon :—"For young students of geology who read about and study rocks, some of which are not to be procured *in situ* anywhere in the neighbourhood of Melbourne, Coode Island forms a splendid collecting ground. Many kinds of metamorphic rocks, including various beautiful gneisses, of which some bear bands of perfectly crystallized red garnets, granite porphyries, granites of various textures, schists, limestones crowded with fossils, varied sandstones and quartzites, are among the specimens to be found in abundance on the south-east portion of the island. These would constitute handsome educational cabinet specimens of types of rocks difficult to procure otherwise except at some expense, but it must be borne in mind that under the circumstances of their occurrence their place of origin cannot be recorded with any degree of certainty."

All the members of the party were well satisfied with their outing, and expressed a wish to again have an opportunity of visiting the island. We would therefore suggest that the committee, when drawing up next year's excursion list, should include a trip to Coode Island, say, at the end of October or early in November. A comparison could then be made by members between autumn and spring conditions.—C. FRENCH, JUN., and J. R. TOVEY.

SOME AUSTRALIAN BOOKS WORTH READING.—"For variety of trees one has to get out to the desert country, where flourish the 'kurrajungs'—too well known to need description—and silky oaks. Nothing could be more exquisite to look upon than a forest of these trees, which grow very closely together, and whose stems are seldom more than eight inches in diameter. As a breeze sweeps over their gleaming foliage, a sea of billowing silver, darkening and glistening as the sunlight plays upon the leaves, appears before the delighted traveller."—From "Collar and Cuffs," by St. C. Grondona, a description of station life in Central Queensland. "It was joyous to see how the Australian bush, the bush of the West, came up out of slumber. Flocks of cockatoos and pink galahs—flying together, making a delightful colour scheme of pink and grey and white and saffron—screamed across the timber, or circled cautiously down to the river to drink. Sometimes a little mob of Black Duck went whizzing up-stream, or a brace of mottled Wood-Duck passed by carefully out of gunshot. Rhipi, the wagtail, and his feathered brother the Peewit, sought the early insect with interchange of civilities. Gay parrots streaked across stream, flashing coloured images in unruffled water. All the bush world became awake, alert, industrious—full of quest and call."—From "River Rovers," by E. J. Brady, an interesting account of a voyage down the Murray by motor boat.

"PERRY'S ARCANA"—AN OVERLOOKED WORK.
BY GREGORY M. MATHEWS, F.R.S.E., AND TOM IREDALE.
(Communicated by F. G. A. Barnard.)

(Read before the Field Naturalists' Club of Victoria, 15th Jan., 1912.)
It rarely happens that a work published in monthly parts, of which twenty-one were issued, and dealing with subjects from every class of natural history, entirely escapes the notice of systematists in every branch of science for one hundred years. That such would appear to be the case with the periodical above named suggests that a *résumé* of its contents will be of interest, especially as many novelties are described and new generic names introduced.

On the 1st January, 1810, appeared the first part of a monthly journal after the style of the well-known "Naturalists' Miscellany" of Shaw and Nodder. It contained four plates, with accompanying letter-press and additional pages of interesting matter. Twenty similar parts were issued, but as the book now under review does not include the original wrappers we cannot give the title, but the title-page of the bound parts reads:—

"Arcana—or—The Museum of Natural History:—containing the most—recent discovered objects.—Embellished with coloured plates,—and—corresponding descriptions:—with—Extracts relating to Animals,—and—remarks of celebrated travellers:—combining a—general survey of Nature.—London:—Printed by George Smeeton, St. Martin's Lane—for James Stratford, 112 Holborn Hill.—1811."

A page of dedication to J. C. Lettsom, Esq., M.D., &c., is concluded "by George Perry." The first four plates are headed "Zoology, Pl. I.," "Conchology, Pl. I.," "Botany, Pl. I.," and "Entomology, Pl. I." This plan was not implicitly followed, though a similar system of plate division was adopted, the plates dealing with diverse subjects each month.

We are acquainted with only four copies of the work—one in the Natural History Museum, South Kensington; one in the library of the Zoological Society, London; one in Sweden, and the fourth in our private library at Watford.

We have carefully collated the work, and as the plates are all dated in fours we conclude they were issued as dated. This conclusion is reinforced by internal evidence, as we note in the letter-press to a December plate the following:—"In a former number of the 'Arcana' (for May) we imparted to our readers a new species of this curious genus." Upon reference we find the plate referred to is dated May. Again, in the September plates a direct reference to the forthcoming publication of a work is given, which work did not appear until after January, 1811. Other confirmatory notes we give in the following pages.

The plates and letter-press are neither numbered nor paged, so for the purposes of this paper we have numbered the plates I. to LXXXIV., and will refer to them under these numbers. It is easily remembered that Plates I. to XLVIII. were issued in 1810, and Plates XLIX. to LXXXIV. in 1811, while, as four were published monthly, the exact month is soon calculated.

It is only just to record that Mr. C. Davies Sherborn, while engaged on the second part of his monumental work, the "Index Animalium," had duly noted all the new names in this work, and they have been carefully recorded for the benefit of scientific workers and are at present available in the Geological Department of the British Museum (Natural History). It would thus have been unnecessary to draw up these notes were it not for the fact that the publication of that much-desired second volume of the "Index" does not seem to be yet in sight owing to the colossal nature of the undertaking.

Interested mainly in birds and shells, we shall first deal with the plates covering these subjects, and then note the other plates discussing points that have attracted us while working up the first two subjects.

The author of the "Arcana" also published a "Conchology," and the Australian shells therein have been discussed by Hedley (Proc. Linn. Soc. N.S.W., 1902, p. 24),* who has given a history of that book, as well as a life of the author. The "Arcana" is important inasmuch as it was mainly published before the appearance of the "Conchology," and, dealing with much the same material, antedates the "Conchology," and this precedence of this hitherto unquoted work necessitates some rather important alterations.

AVES.

Plate VII. is the first to give a bird, the Condor Vulture being there represented without any scientific equivalent being proposed. This is one of the few instances where no Latin name is quoted.

Plate IX. is named *Psittacus nonpareil*, a hitherto unrecorded synonym of *Platycercus eximius*, Shaw.

Plate XI. is of *Psittacus viridis*, which enters into the synonymy of *Pezoporus terrestris*, Shaw.

Plate XX. shows *Ara militaris* from "New Holland," being, however, *Ara militaris* (Linné) of South America.

Plate XXII. is a splendid figure of the Red-headed Crane of New Holland, which Perry named *Ardea rubicunda*. One of

* See also a paper by Mr. J. H. Gatlift in "Victorian Naturalist" for September, 1902 (xix., p. 75).—ED. VICT. NAT.

us has already pointed out (Nov. Zool., vol. xvii., p. 499, 1910) that this name must be used.

Plate XXIX. is of *Paradisea regia*, and is Linné's species.

Plate XXXVI. figures *Psittacus papuensis*, from Papua.

In the text is written, "resemblance to that of the *Ara militaris* or Military Macaw, described in the fifth number of the 'Arcana.'" *Ara militaris* is Plate XX., showing that up to this point the four plates per month had apparently been duly issued.

Plate L. represents the Red Phalarope, which Perry names *Tringa rubra*, variety.

Plate LVI. is of *Pelicanus africanus*, which must enter into the synonymy of *Pelecanus rufescens*.

Plate LIX. is of the Black Swan, which Perry called *Anas cygnus-niger*.

Plate LXX., figuring *Lanius aurantius*, from Buenos Ayres, is a species of *Thamnophilus*, but seems indeterminable.

Plate LXXVIII., of the Crowned Crane of Africa, is called *Ardea coronata*, which passes into the synonymy of *A. pavonina*, Linné.

Plate LXXXII. is a figure of a Cassowary, which they called *Cassowara eximia*, and guessed as habitat South America. It is apparently a New Guinea form, and this name has not previously been noticed in literature.

MOLLUSCA.

Plate II. is very important to conchologists. On it are figured four shells, of which No. 1 is called *Volutella divergens*, No. 2 *Septa scarlatina*, No. 3 *Rostellaria rubicunda*, and No. 4 *Trochus aparia*. The text states:—"In describing the four shells contained in the annexed plate, we shall endeavour previously to explain the different characters of each genus, that the reader may afterwards more clearly recognize each peculiar distinction appropriate thereto."

This is the first introduction of the generic name *Volutella*, which, however, falls as a synonym of *Vasum*, Bolten (Museum Boltenianum, p. 56, 1798); this species is perhaps *V. muricatum*, Born.

This introduction of the genus *Septa*, however, once more disorganizes the nomenclature of the Tritons. Perry diagnoses it thus:—"Shell univalve, spiral, having membranaceous septa or divisions, placed upon the body and spire opposite and alternate: these are of a different colour to the rest of the shell, and slightly tuberculated." The only species at that time noted and figured is *Septa scarlatina*: consequently this species becomes automatically the type of *Septa*. This shell is easily identified as *Murex rubecula*, Linné (Syst. Nat., 10th

ed., p. 749, 1758). In the Bull. U.S. Fish Commission, vol. xx., part 1, 1900, p. 416, Dall and Simpson used *Septa*, Perry (1811), to replace *Triton*, Montfort (1810), not Linné (1758), *Tritonium*, Cuvier (1817), not Muller (1776), for the shells congeneric with *Murex tritonis*, Linné.

In the Smithsonian Miscell. Collections, vol. xlvii., pp. 114 *et seq.* (1904), Dall wrote up an historical and systematic review of the Frog-shells and Tritons, and therein gave his reasons for thus accepting *Septa*, and named as type *S. rubicunda*, Perry.

But this prior introduction of *Septa* in conjunction with a shell not congeneric with *S. rubicunda*, Perry, necessitates a readjustment of names. Pilsbry (Proc. Acad. Nat. Sci. Philad., vol. lvi., p. 21, 1904) cited *Septa* as a sub-genus of *Aquillus*, Montfort, but as *Septa* appeared on 1st January, 1810, and *Aquillus* 1810, it is very doubtful whether the latter appeared at such an early date. It is certain that *Septa* must be referred to the neighbourhood of *Cymatium*, Bolten (1798), but whether as an absolute synonym of that name or whether it can be retained sub-generically we are not prepared to decide. A monograph of the Tritons is much required, and would appear to be urgently necessary, inasmuch as Dall's review (above quoted) was of a skeletal nature, and not altogether satisfactory, as we have seen the same shell given three different generic locations by students attempting to utilize Dall's key.

The third shell is called *Rostellaria rubicunda*, and it is obviously the same shell as figured by Chemnitz (vol. xi., p. 146, tab. 195A) as *Strombus erythrinus*, and which Tryon (Man. Conch., vol. vii., p. 119, 1885) relegated to the synonymy of *Strombus dentatus*, Linné, with varietal rank.

The fourth is *Trochus apiaria*, "a nondescript, lately imported from Botany Bay." The same figure is given in the "Conchology," pl. xlvii., fig. 3, with the description slightly altered and the locality given as Van Diemen's Land. When Hedley discussed Perry's Australian shells he ignored this species, and we are unable to definitely name it.

Plate VI. is of *Septa tritonia* = *Murex tritonis*, Linné.

Perry wrote:—"This shell, classed with the genus *Septa*, and which has hitherto been described erroneously as a *Murex*"; and then noted—"Another shell, which has considerable resemblance in its general form to the one now described, has lately been discovered in New Holland, but it differs in the minuter peculiarities of form and colour, being much smaller, and of a redder colour." This apparently refers to the shell figured in the "Conchology" as *Septa rubicunda*. In the later work *Septa tritonia* is not reproduced, though most of the "Arcana" shells are here again illustrated.

Plate XII. is of *Pomacea maculata*, which "is conceived to be a native of the South Seas." This is the first use of the generic name *Pomacea*, which is a synonym of *Ampullaria*, Lamarck. The species we cannot recognize, while the habitat, when it was re-figured in the "Conchology," pl. xxxviii., fig. 3, was altered to West Indies.

Plate XV. contains figures of four fossil shells, named *Conus angulatus*, *Aculea angulata*, *Cerithium lœvis*, and *Cassis verrucosa*, of which is written:—"The above shells are of the kind found in different parts of France, in beds of gravel or clay."

Plate XVI. purports to be a figure of *Conus gloria-maris*, and a shell in the British Museum is mentioned. When the same figure was reproduced in the "Conchology," pl. xxv., fig. 1, it was definitely said to be "delineated from a fine specimen in the British Museum." The figure seems, however, to have been drawn from a nice specimen of *Conus textilis*; moreover, no record is kept of a British Museum specimen of *Conus gloria-maris* at that early date. Perry notes:—"The *Conus* has a considerable analogy to the genus *Volutella*, lately established."

Plate XIX. is a good representation of "*Bulimus zebra*, a native of the South Seas and of the islands of New Zealand," which shows a quaint mixing of localities, the shell being the well-known *Achatina zebra*, Gmelin, of Africa.

Plate XXIII. introduces the genus *Triplex*, the species name chosen being *foliatus*. This is a splendid figure of the shell many years later named *M. palmarosæ*, Lamarck (Anim. s. Vert., vol. ix., p. 572). When, later, Perry reproduced the same figure in the "Conchology" (pl. vi., fig. 3), he altered the specific name to *T. rosaria*, and the reproduction is not such a nice picture as the "Arcana" one. Thus by monotypy the type of *Triplex* is *T. foliatus*, Perry, and the specific name supersedes *M. palmarosæ*, Lam.

Perry remarks:—"The *Triplex* genus of shells are remarkable for their triangular form, which is occasioned by three thick divisions placed lengthwise on the outside of the shell, and which form its chief ornament. Other shells, which in many respects have a resemblance to it, are distinguished in a similar way: the *Monoplex* has one fold on its body; the *Biplex* two folds; the *Hexaplex* six folds, and so on with the following species, until we arrive at the greatest number, the *Polyplex*, in which the folds are very numerous, but the number not defined."

Plate XXVIII. contains figures of five shells, the centre one being *Scalaria disjuncta*, the *Turbo scalaris*, Linné. Of the other four is written:—"The four small shells which accom-

pany the Wentletrap are drawn from specimens lately imported from New South Wales. Nos. 1 and 2 are of the *Conus* genus, and resemble the larger kind in their form; No. 3 is evidently of the *Trochus* kind; No. 4, *Pyrula*, resembling a little pear. They are given to show the variety of their patterns and form, and are hitherto unnamed by any conchologist."

Plate XXX. is a nice figure of *Voluta pacifica*, of which it is written that it was discovered "by that accurate investigator of nature, Dr. Solander, in one of the small islands near New Zealand, when employed upon a voyage of discovery with that illustrious circumnavigator, Captain Cooke."

Plate XXV. contains two beautiful figures of shells, *Triplex flavicunda*, from Botany Bay and New Zealand, and *Triplex rubicunda*, from Ceylon. These were both figured under the same names, but not such good figures, in the "Conchology" (pl. vi., pp. 2 and 4), concerning which Hedley wrote:—" *Triplex flavicunda*, Perry, and *T. rubicunda*, Perry, are marked by Deshayes (An. s. Vert., ix., p. 574) as synonyms of *Murex adustus*, Lam. (1822). Over all these names *Purpura scabra*, Martyn (Univ. Conch. 1789), pl. 113) has precedence. While agreeing that *Triplex flavicunda*, Perry = *Purpura scabra*, Martyn, we would point out that *Triplex rubicunda*, Perry, seems to differ, and is identical with the shell named *Murex rubiginosus* by Reeve (Proc. Zool. Soc. Lond., 1845, p. 86), over which it has priority. We have examined Reeve's type.

Perry notes that *Murex ramosus*, Linné, should be called *Triplex ramosus*, as it is not referable to *Murex* as he restricts it.

Plate XXIX., named *Conus particolor*, is a good figure of a specimen of *Conus aulicus*, Linné. This was omitted from the "Conchology," so has hitherto been unrecorded.

Plate XLIII. shows Perry's *Bulimus phasianus*, which becomes a synonym of *Phasianella australis*, Gmelin.

Plate XLVII. is a beautiful figure of the shell later named *Murex tenuispina* by Lamarck. It was re-figured in the "Conchology," pl. xlvi., fig. 3, and there re-named *Aranea triremis*. This name has been accepted in lieu of *M. tenuispina*, Lamarck, by Hedley, but another alteration seems necessary, as on this plate, which has priority, the name chosen is *Aranea gracilis*.

Plate LII. is named by Perry *Strombus solitaris*, which name becomes a synonym of *Strombus gallus*, Linné.

Plate LIV. is of a magnificent species of *Murex*, measuring 184 mm. in length, and which is named *Aranea conspicua*. This is a much better figure than the one under the same name in the "Conchology" (pl. xlvi., fig. 3), and, though of such grand dimensions, we have been unable to identify it.

Plate LVIII. is lettered *Buccinum dilatum*, but the text is headed *Buccinum orbiculare*. It is a good figure of the shell later named *Dolium maculatum* by Lamarck (An. s. Vert., vol. x., p. 140, 1844), and, as both Perry's names have priority, we prefer the text name, and therefore *Tonna orbicularis*, Perry, must be used for the shell now called *Tonna maculata*, Lamarck.

Plate LXII., named *Trochus zebra*, is a fair figure of *Trochus niloticus*, Linné.

Plate LXVI. is called *Buccinum distentum*, and of which Perry writes :—" It differs from others chiefly in the shortness of the rostrum or beak, and more especially from that which we have described formerly in No. XV. of the 'Arcana.' " The figure is indeterminable, but seems to have been drawn from a specimen of *Turbo petholatus*, Linné, and, the mouth having been damaged, the artist has imagined a canal. No. XV. of the "Arcana," above referred to, would contain Plate LVIII., where the other dissimilar *Buccinum* is figured, and it would follow that four plates to each number had been adhered to.

Plate LXXI., of *Pecten sanguineum*, from the Red Sea, is another indeterminable figure.

Plate LXV. is a figure of *Strombus chiragra*, Linné, which Perry named on the plate *Strombus divergens* and in the text *Strombus nigricans*.

Plate LXXX., giving a splendid figure of a Cone which Perry called *Conus bandatus*, is another of his puzzles. It is quite indeterminable, but may have been drawn from a specimen of *Conus miles*, Linné, to which has been added a little imagination by the artist.

Plate LXXXIV. is entitled *Pinus*. The text is headed "Class Fossilia, Order Univalvia, Species *Rostellaria*." This last would seem to have meant genus, and the text bears this out, but "appears to belong to the genus *Rostellaria*."

ECHINODERMA.

Plate XXXIV. is of *Echinus castaneus*, a native of the South Seas and of the coasts of New Holland.

Plate XXXVIII. represents *Echinus stellaris*, from the South Seas, and in the text another species is mentioned as *Echinus sceptiferus*. None of these names appear to have been noticed before in literature.

MAMMALIA.

Plate I. figures the Tiger, *Felis tigris*, Linn.

Plate X. is of the *Platypus*, or *Ornithorinhus paradoxus*, from New Holland. The text contains the following :—" A second animal of the same genus, and which may be called the *Platypus longirostra*, has lately been shot in Adventure Bay, at Van Dieman's Land." Then follows the description, which seems

to pertain to *Echidna setosa*, Cuvier, as figured in Gould's "Mammals of Australia," vol. i., pl. 3, and has priority.

Plate XIII. is of the Dolphin.

Plate XIV. represents the Vicuna, *Camelus pacos*, Linné.

Plate XVII. is of the Koalo, or New Holland Sloth.

Plate XXI. is a nice figure of the Wombach of Botany Bay, which Perry called *Opossum hirsutum*. This is the first and only time we can note Opossum being used as a generic name. Fortunately, it falls as a synonym of *Phascolomis*, Geoffroy (1803). The specific *hirsutum*, however, would appear applicable to the New South Wales Wombat, and the earliest name available.

Plate XXVII. figures *Dipus muscola*, from New Holland. We are unable to identify this figure.

Plate XXXII. illustrates the "Opossum Flying Mouse, that lives in the trees and forests of Botany Bay." Perry writes:—"Character.—Not exactly known."

Plate XL. is a figure of *Sapajus jacchus*.

Plate XLI. illustrates *Bradypterus striatus*, supposed to come from South America.

Plate XLIX. figures the Giraffe, from near the Cape of Good Hope, which Perry called *Camelus camelopardalis*.

Plate LIII. introduces the genus *Antelopa*, the plate representing *Antelopa montana*, the Mountain Cow of Morocco.

Plate LVII. is the Lion, *Felis leo*.

Plate LXI. is of the Elephant, from Africa and Asia, which Perry named *Elephas gigas*, and in the text he wrote:—"There is also found a second and different species, which is said to reside in the kingdom of Tibet, and, being much smaller and of an opposite form, is to be considered as a separate animal from the above under the title or name of *Elephas socotrus*."

Plate LXIII. is of the Panther, *Felis pantherus*, from Senegal.

Plate LXV. is of the Leopard, *Felis leopardis*.

Plate LXVII. figures a skull of *Babyrousa quadri-cornua*, from Amboyna. According to Palmer (Index Generum Mammalium, 1904, p. 130), the earliest name for this genus is *Babirussa*, Frisch, but as that name is invalid, that writer being non-binomial (= non-binary), the next in sequence is *Babiroussus*, Gray (Lond. Med. Repos., vol. xv., p. 306, April, 1821). Perry's *Babyrousa* would thus appear applicable, having ten years' priority over Gray's name.

Plate LXVIII. is a figure of the Guanaco, which Perry called *Guanaco patagonia*. Again referring to Palmer (p. 128), we find the earliest name for this genus is *Auchenia*, Illiger, proposed the same year as Perry's, but that this name is pre-occupied by Thunberg (1789), and therefore *Dromedarius*,

Wagler (1830), is considered available. Perry's *Guanaco* seems to claim usage, being nineteen years earlier than Wagler's name.

Plate LXXII. is a skull of the fossil Elk, *Cervus fossilis*.

Plate LXXIII. is of *Dipus tridactylus*, or Kangaroo.

Plate LXXVI. figures *Equus zebra*.

Plate LXXVII. illustrates *Ovis aries*.

Plate LXXXIII. is of the *Hyæna*.

REPTILIA.

Plate V. is a picture of the Rattlesnake, *Crotalus horridus*, Linné.

Plate XXV. is a new Chameleon, called *Chamæleo pallida*, from Egypt.

Plate XXXIII. figures a tortoise from Panama, which Perry calls *Testudo panama*.

PISCES.

Plate VIII. is of *Sparus bandatus*.

Plate XVIII. is of the Sea Horse, genus *Syngnathus*, or *Hippocampus*, species *joliatus*, a native of Botany Bay. In the text is written:—"The *Hippocampus*, or Sea Horse, has been always placed by the most eminent naturalists with *Syngnathus* . . . and . . . The fish called *Syngnathus*, or Pipe Fish, we cannot help considering as decidedly distinct from the proper *Hippocampus*, to be divided into a separate form, and we regard the different form of the tail already described as quite sufficient reason." This is the first use of *Hippocampus* generically, and as type must be quoted *H. joliatus*.

Plate XXVI. purports to figure a new species of *Stromateus*—viz., *depressus*.

Plate XLV. represents *Hippocampus erectus*, and in the text we again note:—"In a former number of the 'Arcana' (for May) we imparted to our readers a new species of this curious genus. . . . The *Hippocampus erectus* is a native of the American Seas." Plate XVIII. is here referred to, confirming the conclusion that four plates were regularly issued monthly.

Plate LV., figuring *Congiopodus percatus*, appears to introduce a new generic name which has not hitherto been noticed.

Plate LXIV. is of *Esox niloticus*, from the Nile.

Plate LXXIX. figures *Zeus faber*, or John Dory.

INSECTA.

Plate IV. gives figures of two species of *Fulgora*—*F. pyro-rhynchus*, from "Bengal," and *F. candelaria*, a native of China.

Plate XXIV. figures *Mantis foliaceus*.

Plate XXXI. is of *Papilio demosthenes*, from the Brazils.

Plate XXXVII. contains two figures—the upper one of

Papilio phillis, Fabricius, from Mexico; the lower, *Phalæna corollaria*, from North America.

Plate XLVI. figures a *Papilio* of the division *Arcuatus*, which Perry then called *Arcuatus cœruleus*. In the text Perry proposes a new classification of the Papilionidæ, naming the divisions from the shape of the wings. His six divisions are named—*Arcuati*, *Orbati*, *Caudati*, *Excelsi*, *Cuspidati*, and *Muscarii*. Though noting these are divisional names only, and using them as such, in a few cases, as the one under notice, he omits the prefixation of the generic *Papilio*.

Plate LI. is of a *Phalæna* of the division *Arcuata*, species name *vitrea*, from South America.

Plate LX. represents a *Papilio* which Perry called *Arcuatus catenarius*, from the Brazils.

Plate LXIX. is a beautiful figure of *Sphynx castaneus*, said to have arrived from Port Jackson.

Plate LXXIV. represents a *Phalæna* of the division *Arcuatus*, but here called *P. fenestra*.

Plate LXXXI. is of *Papilio volcanica*, from Rio de la Plata and Peru.

PALÆONTOLOGY.

Plate XLII illustrates a fossil Trilobite, which Perry called *Monoculithos gigantea*, a generic introduction previously unnoticed.

Plate XLVIII. contains two more species of Perry's genus *Monoculithos*, the specific names used being *polymorphus* and *hexamorphus*.

BOTANY.

Plate III. in the first part is headed "Botany, Pl. I.," and is noteworthy as being the first and last to deal with a botanical subject, the plate representing the *Ceroxylon*, or Palm-tree.

MEMOIRS OF THE NATIONAL MUSEUM, MELBOURNE.—No. 4 of this publication, recently issued, contains several articles of great value to Victorian collectors. Dr. Cox and Mr. C. Hedley, F.L.S., of Sydney, contribute "An Index to the Land Shells of Victoria," enumerating twenty-one species, besides several varieties, some of which are new and are well figured. Dr. A. J. Turner, of Brisbane, contributes an article on "Some Types of Lepidoptera in the National Museum, Melbourne": these are principally Victorian Heterocera. Mr. Howard Ashton catalogues the Victorian Cicadidæ (twenty-two species) in the Museum collection, and disposes of a host of synonyms, and describes three new species (one Victorian). Mr. F. Chapman, A.L.S., raises a fossil pecten from Torquay from varietal to specific rank under the name of *Pecten præcursor*. Other articles are by Mr. F. Chapman, A.L.S., Mr. A. M. Lea, F.E.S., and Mr. R. H. Walcott, F.G.S.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th May, 1912.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From Professor A. J. Ewart, the Club's representative on the Wilson's Promontory National Park Committee, stating that the acceptance of tenders for the grazing of cattle in the Park had been postponed until a further meeting, and that, in the meantime, certain inquiries were being made relating to the question.

REPORTS.

A report of the excursion to Alphington on Saturday, 27th April, was given by the leader, Mr. J. A. Leach, M.Sc., who said that the afternoon had been spent in examining the valley of the Darebin Creek and its junction with the Yarra, and, though nothing of particular interest had been noted, the members were well pleased with the outing.

A report of the excursion to Ivanhoe and Heidelberg on Saturday, 17th May, was, in the absence of the leader, Mr. J. T. Hamilton, F.L.S., given by Mr. F. G. A. Barnard, who said that the party had first visited the large Red Gum tree near the Heidelberg road, to preserve which a fruitless effort had been made some time ago. Passing then to the Eaglemont estate, its gravel-capped hills were examined and their probable history considered. In one of the pits a thickness of about fifteen feet of quartz gravel was exposed, many of the stones being several inches in diameter. From another hill, about 280 feet above sea-level, a fine view of the Yarra valley was obtained, and further physiographical conditions discussed. A return towards Heidelberg station was then made, noticing on the way two dykes in the deep Silurian cutting near the station, while from the Eltham road a good view was obtained of the basaltic country towards Preston and Coburg.

A report of the junior excursion to Beaumaris on Saturday, 4th March, was given by the leader, Mr. R. W. Armitage, B.Sc., who said that the excursion had been well attended, and several interesting fossils had been collected. Some attention was given to the effects of wave action on the cliffs.

ELECTION OF MEMBERS.

On a ballot being taken, Rev. A. Mitchell, Orrong-road, Elsternwick, was duly elected an ordinary member; Mr. T. A. Robinson, Armidale, *via* Sale, a country member; and Miss Jean Robertson, Hutcheson-street, Moonee Ponds, and Masters I. R. S. Smith, 20 Isabella-street, Malvern, G. R. Weigall, St. Kilda-street, Elsternwick, V. F. J. Woinarski, Victoria-street, North Melbourne, D. Keep, Alma-road, Caulfield, F. S. Vine, Redan-street, St. Kilda, D. Howard, 39 Albert-road, South Melbourne, J. L. Dean, Kerferd-road, Albert Park, J. Cuming, Ingles-street, North Port Melbourne, D. Cuming, Ingles-street, North Port Melbourne, C. Faul, Burnett-street, St. Kilda, R. J. Percy, Queen's-road, South Melbourne, F. Holdsworth, 148 Glenferrie-road, Malvern, H. Klug, Equitable Building, Collins-street, R. Grey-Smith, Marysville-street, St. Kilda, C. W. Hale, Point Nepean-road, Elsternwick, as junior members of the Club.

GENERAL BUSINESS.

Messrs. D. Best and J. Stickland were elected to audit the accounts for 1911-12.

Nominations for office-bearers for 1912-13 were duly made.

PAPERS READ.

1. By Mr. F. Chapman, A.L.S., entitled "On the Occurrence of Some Sepias New or Little Known to the Victorian Coast."

The author said that, besides the Common Cuttle-fish, *Sepia apama*, M'Coy, three other species are represented by remains found on Victorian beaches, especially at Torquay, between Port Phillip Heads and Cape Otway. *S. braggi*, Verco, had already been recorded, but *S. latimanus*, Quoy and Gaim., and *S. capensis*, D'Orb., he now recorded as new to the State.

Dr. T. S. Hall, M.A., congratulated the author on his observations, and hoped that the diagram exhibited would be published in the Club's journal.

Mr. F. G. A. Barnard remarked that at Easter-time the beach near Wonthaggi was strewn with hundreds of cuttle-fish bones of various sizes, but, not having collected any, he could not say how many species were represented.

2. By Mr. A. D. Hardy, F.L.S., F.R.M.S., entitled "On the Distribution of the Leaf Glands of Some Victorian Acacias."

The author said that, owing to certain of his experiments as to the morphology of the leaf glands not having been completed, he would confine his remarks to their distribution on the leaves and phyllodes of some of the commoner species of acacias. He thought that in some instances too much importance had been attached to the presence or absence of the

glands, and exhibited specimens in illustration of his remarks.

3. By Mr. J. W. Audas, F.L.S., entitled "An Eastertide in the Victorian Pyrenees."

The author dealt with the plants, &c., noticed during a few days' ramble in the Mount Cole district, near Beaufort, and referred to the timber resources of the district.

NATURAL HISTORY NOTES.

Mr. G. A. Keartland related an instance of a magpie having been attacked by a Boobook Owl, while the magpie's mate remained near, and evidently supported the defence. Mr. A. D. Hardy said that Mr. Keartland's remarks recalled to his mind a somewhat similar incident some years ago, when two hawks preying on a murdered magpie deliberately took it in turns to feed and keep guard on an adjacent stump, while other magpies vainly attempted either rescue or revenge.

Mr. F. Chapman said that in the paper by Messrs Mathews and Iredale on "Perry's Arcana," published in the current (May) *Naturalist*, in dealing with the palaeontology of the publication, the authors, referring to a fossil trilobite, called by Perry, in 1810, *Monoculithos gigantea*, remark, "a generic introduction previously unnoticed"; while, as a matter of fact, Martin, in his "Petrificatia Derbiensis," 1809, figures a limuloid or king-crab under the name of *Entomolithus monoculites lunatus*, so that it is quite probable that Perry identified his specimen with the previously-figured fossil of Martin, and now merged in the genus *Belinurus*.

EXHIBITS.

Details of the exhibits will appear in next issue.

After the usual conversazione the meeting terminated.

NEW AUSTRALIAN BIRDS.—In the second (April) number of the *Austral Avian Record* (London) to hand by the last mail, Mr. Gregory Mathews devotes twenty-eight pages to additions and corrections of his "Hand-list of the Birds of Australia." Nearly 120 new birds are listed, nearly all sub-species with trinomial names. North-West Australia furnishes the greater number, though several are recorded for Victorian localities. This part of the record is rather scantily done—frequently the State is omitted, hence one unacquainted with the geography of Australia will sometimes be at a loss to know what part of the Continent forms the bird's habitat. In a second article are given one hundred and thirty-seven descriptions of new or hitherto undescribed eggs of some Australian birds, naturally many of them belonging to the trinomial sub-species of the other list. Among them is that of *Dacelo gigas tregellasi*, from Auburn, Victoria.

THE QUAIL SEASON, 1912.

BY G. A. KEARTLAND.

(Read before the Field Naturalists' Club of Victoria, 15th April, 1912.)

WHEN I penned my paper (*Vict. Nat.*, xxviii., pp. 90, 120) last year on the alteration of the shooting season for quail and its effects I intended to abandon the subject finally; but as my statements were ridiculed by the powers that administer the *Game Act*, and I was accused of the folly of basing my opinion on that abnormal season, I determined to again watch the birds carefully this year.

It was on the last Saturday in November that I first saw a nice lot of quail, but they had not paired, although so late in the season. In January they had all paired; but, in spite of careful search with the assistance of a good pointer dog, I could not locate a single nest of eggs or brood of young birds. On the 4th February I had another search, but, although I saw a fair number of quail, I could not see any indication of breeding.

An invitation from a farmer friend induced me to try my luck on the opening day of the shooting season (Thursday, 15th February). An early start enabled my son and self to reach the paddock in which I had been told the birds were just at daybreak. I was soon at work, and so were a number of other shooters, but the ground was dry, and only good dogs were any use, as the scent was very faint, owing to the lack of dew. By 9 a.m. I had shot a few birds, which were taken at once to the shelter of a dairy farm and left there until 8 p.m. After some refreshment we decided to have another search, but the sun was too hot for either man, dog, or quail. About midday I again met a gentleman who was shooting in the paddock where we commenced in the morning. He had about ten brace of birds, but, as he had been carrying them in the sun, they were decidedly "high," and appeared to be decomposed into a solid mass. My dogs were now showing signs of distress, so we sought a friendly shade in the vicinity of a large dam and waited for evening, at the same time casting envious eyes at the dogs, which were lying in the water with only their heads above the surface. In the evening we met a resident of Thomastown whom we had also seen earlier in the day. He was determined to secure a few more birds, and had a fresh dog to help him. Notwithstanding his perseverance, he only got seven and a half brace, but had such a baking in the sun that he had to take to his bed next day and send for the doctor. I heard a week afterwards that he was still delirious from the effects of the sun and exertion combined. On reaching home the birds I shot were plucked, and, as I was anxious to ascertain whether they showed any indica-

tions of breeding, I opened them myself, and found that all of the female birds, without a single exception, were full of eggs, some of which were nearly ready for laying. Although I examined the contents of several bags, I could not find a single bird in immature plumage. Therefore, if last season was an abnormal one, this season is much more so.

On Friday, 16th February, I had a trial of another farm, but by 8.30 a.m. decided to go straight home, as the heat was too much for the dogs. It is over thirty years since I saw the folly of going duck-shooting on the opening day, as I consider it wanton waste to slaughter a lot of birds and then throw them away. I have now determined to do the same with regard to quail-shooting. A gentleman who was duck-shooting with a party from Government House on the opening day this season told me that he was sure that less than one-tenth of the birds shot were fit to use when they reached home.

Why cannot the shooting of all feathered game be prohibited until the 1st April, by which time the birds would all be matured and be fit to use or present to our friends? I am informed that in many of the States of America feathered game shooting is only permitted during the winter months. A perusal of the press reports confirms the opinion. The *Dandenong Advertiser* of 22nd February says:—"Some fair bags of quail were got at the opening, which is at least one month too early for this district (Pakenham). A number of birds were unable to fly, and in some cases were run down by the dogs and caught." The *Argus*, 23rd February—"Mr. Row says that out of 75 brace shot at Scoresby, he only found one bird that could not fly. In southern districts of Victoria one might expect to find birds breeding late." [That one bird which could not fly must have been very young, as birds which I reared from the eggs could fly well when eight days old.—G. A. K.] Another paragraph in the *Argus* of 23rd February gives a different account. A correspondent, writing from Ballarat a description of his shooting in the Ascot district on the 15th, says that "he came across three young birds about two or three days out of the shell, and about half the size of a canary—probably a second brood. He also saw many young birds which were just about able to fly." In the *Argus* of 8th March we read:—"A member of the Bird Observers' Club who went out on the opening day said he met another shooter with a number of 'squeakers' in his possession. His excuse was, 'They all count towards the bag.' " A good reason for placing a limit on game bags. Another correspondent, writing from Glenroy, says:—"I was out on Saturday, and found the majority of the birds very small—some not as large as sparrows, and only partly fledged. In my opinion, the season should not be opened before the

middle of March—certainly not before the 1st March.”—*Argus*, 8th March. A South Yarra correspondent writes:—“In the preparation of quail for table at our house it was discovered that some of them contained eggs. These birds were shot at Laverton on 24th February. This alone should cause a doubt as to the advisability of opening the season before the 1st March.”

On 16th March I received a letter from one of our members (Mr. F. Cayley), saying that he had made inquiries from a number of shooters and others in a position to observe quail at Werribee. Some of the shooters saw a few squeakers, but all were able to fly. Others declared they saw none. A couple advised the Ornithological Society to mind its own business. The manager of the Manor estate saw a large number of squeakers. They were all able to fly, but would sooner run or hide. He is the only one who thought the season opened a little too early, and perhaps the least interested. Quail have been remarkably plentiful here this year. Some of the shooters say they have not seen so many for twenty years.

After reading the foregoing items it would be interesting to know how young a squeaker would need to be to enjoy the contempt of the shooter as being too small to shoot.

In confirmation of my oft-repeated statement that no matter when the season opens there are people who will endeavour to steal a march on the law-abiding sportsmen, I had ample proof on 15th February. Just as the sun was rising I noticed my young dog smelling something which, on examination, proved to be a dead quail which had been shot two or three days before. It was quite putrid, and had shot perforations on its beak and both legs. On mentioning my find to a resident of the district he said:—“I am not at all surprised, as two of the neighbours picked up winged quail last Sunday, and both birds were suffering from fresh wounds.”

BOOBOOK OWL AND MAGPIE.—On 4th April, at 5.30 a.m., I heard one of the magpies in my garden uttering cries of distress as if caught in a trap. It was bright moonlight at the time, and on looking over the fence I saw the magpie on its back, fighting with beak and claws a Boobook Owl which was attacking it. I drove the owl away and went inside. In ten minutes the noise was repeated, and I watched the fight from the fence until I saw several bunches of feathers fly from the owl. I then drove it away. The magpie seemed none the worse for the encounter. During the battle the other magpie, which was perched in a fruit tree, kept up a constant note of encouragement to its mate, like an ordinary pugilist.—G. A. KEARTLAND.

NOTE ON THE OCCURRENCE OF SOME SEPIAS NEW OR LITTLE KNOWN TO THE VICTORIAN COAST.

BY F. CHAPMAN, A.L.S., Palaeontologist National Museum.
(With Plate.)*(Read before the Field Naturalists' Club of Victoria, 13th May, 1912.)*

WHILST on a visit at Easter, 1903, to Torquay (distant about 15 miles south-westerly from Port Phillip Heads), I was particularly struck with the enormous number of sepiostaires of the common cuttle-fish, *Sepia apama*, Gray, which had been thrown upon the beach, particularly in the neighbourhood of Spring Creek. Amongst these were some other species, nearly equally abundant, which I have since identified as *S. braggi*, Verco, *S. capensis*, D'Orbigny, and *S. latimanus*, Quoy and Gaimard. Many scores of the delicate little cuttle-bones of *S. braggi* could have been gathered from among the grass at the foot of the dunes, whilst *S. capensis* and *S. latimanus* were equally common along the high-tide marks.

On several subsequent visits to Torquay I noticed an almost entire absence of the three species last named, although *S. apama* was generally to be found, in a more or less fragmentary condition. At Easter of this year, however, both Mr. C. J. Gabriel and I witnessed, within a week of each other, the same exceptional abundance of cuttle-bones of the several species, which seemed to be due to a previous spell of rough weather.

SEPIA BRAGGI, Verco.—In 1907 * Dr. J. C. Verco described a new and elegant little species of *Sepia* from Glenelg, South Australia, which he named *S. braggi*. As Dr. Verco pointed out, it seems to be allied to *S. elongata*, Ferussac and D'Orbigny, † but is narrower posteriorly, and curved at the mucronate end for a greater length. Its closest related form appears to be *S. andreana*, Steenstrup, which is a Japanese species, having a sepiostaire with a blunter and more rounded anterior, although, from the figure given in Tryon's "Manual of Conchology" ‡ the forward curvature of the mucronate end is not a distinctive feature.

Altogether, *S. braggi* seems to be a rare or occasional form, since it has only been noticed elsewhere in South Australia by Mr. Zietz. In the paper above mentioned Dr. Verco also remarked that Mr. Hedley had it from Victoria. The latter record was subsequently published as from the Heytesbury coast, Victoria (specimen presented to the Australian Museum by Dr. G. B. Pritchard), as well as from the Maroubra Beach,

* Trans. Roy. Soc. S. Austr., vol. xxxi., p. 213, pl. xxvii., figs. 6, 6a-d.

† Hist. Nat. Ceph., 1835–1848, p. 283, pl. xxiv., figs. 7–10.

‡ Vol. i. (1879), pl. xc., fig. 409.

New South Wales.* Mr. Hedley also suggested (*loc. cit.*, p. 134) that the Tasmanian record of *S. elongata*, D'Orb., was probably based on *S. braggi*, and this surmise has proved correct, since Mr. W. L. May has lately published a note to that effect.†

The largest specimen of *S. braggi* I collected from Torquay (since presented to the National Museum, Melbourne) has the following dimensions:—Length, 62 mm. (the length given for the type by Dr. Verco is 60 mm., whilst Dr. Pritchard's example was of exactly the same length as our specimen, 62 mm.); breadth at widest part of the proostracum, 13 mm.; greatest thickness, 5.5 mm.; the mucro, from base of attachment to apex, is 2.25 mm. in length.

On the ventral surface the shell laminæ in this species are close and symmetrically arched, with a V-shaped sinus on the central axial groove.

Mr. Kershaw has kindly shown me the specimens of *Sepia* in the National Museum collection, and I am able to record, with his permission, *S. braggi* from Frankston, Victoria, and Botany Bay, New South Wales; these were collected by the late Mr. W. Kershaw. Specimens collected by the late Mr. J. Dennant, F.G.S., from Spring Creek, Torquay, are also in the Museum collection. Mr. J. C. Chubb, of the National Museum, has also found the species at Point Nepean.

SEPIA CAPENSIS, D'Orbigny.—The other species accompanying *S. braggi* at Torquay I have identified as *S. capensis*, D'Orb.‡ It somewhat resembles *S. cultrata* (Steenstrup, MS.), Hoyle,§ but the mucro is regularly smooth and retroflexed, and not vertically ridged as in *S. cultrata*. *S. capensis* is recorded off the Cape of Good Hope, and it occurs along the Australian coast in New South Wales, where Whitelegge records it from Port Jackson.||

Dimensions of a typical specimen:—Length, 120 mm.; breadth, 42 mm.; greatest thickness, 10.5 mm.; the mucro, from base of attachment to apex, 6.5 mm.

In the National Museum collection specimens obtained by the late Mr. W. Kershaw came from Botany Bay and Watson's Bay, New South Wales. Besides the Torquay occurrence, *S. capensis* has been collected at Kilcunda (W. D. Chapman).

* Rec. Austr. Mus., vol. vii., No. 2 (1908), p. 134; see also Gatlift and Gabriel, Proc. Roy. Soc. Vict., vol. xxii. (N. S.), pt. i. (1900), p. 38.

† Proc. Roy. Soc. Tas. (1910-1911), p. 307.

‡ D'Orbigny (1826), Ferussac and D'Orbigny (1835-1848), Hist. Nat. Ceph., p. 278, pl. vii., figs. 1-3, pl. xii., figs. 7-11, pl. xvii., figs. 18, 19.

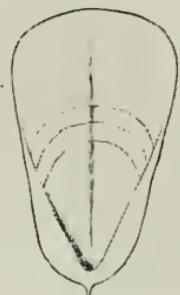
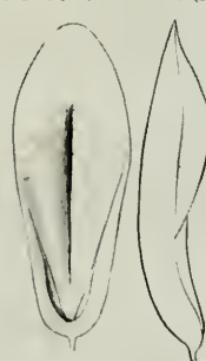
§ Rep. Chall., Zool., vol. xvi., p. 133, pl. xx.

|| Journ. and Proc. Roy. Soc. N. S. Wales, vol. xxiii. (1889), p. 282.

PLATE I.



SEPIA APAMA, Gray

SEPIA APAMA Gray [var]
AUSTRALIAS. CULTRATA, Hope (S. MESTUS Gray)
TASMANIAS. CAPENSIS d'Orb.
Capetown, South Africa and Australia.SEPIA
BRAGGI, Gray
AUSTRALIAS. LATIMANUS, Gray = Gmelin
INDIAN OCEAN, CEYLON, NEW GUINEA, SOUTHERN AUSTRALIA

SEPIOSTAIRES OF VICTORIAN SEPIAS (CUTTLE-FISH),
Showing front and side views.

SEPIA LATIMANUS, Quoy and Gaimard.*—At first sight the sepiostaire of this species might be confused with *S. capensis*. The distinctive characters in *S. latimanus* are the laterally extended posterior margins of the proöstracum, the sudden thickening in the post-median area, the deep median ventral groove, and the stouter, heavier and straight mucro. As a rule, the median dorsal ridge is broader and more depressed than in *S. capensis*.

A typical specimen from Torquay measures:—Length, 135 mm.; greatest breadth, 47 mm.; greatest thickness, 13.5 mm.

Moderately common at Torquay. Already recorded from New South Wales and Tasmania.

NOTE.—The *Sepia mestus*, Gray, which is recorded by Tate and May † from the north coast of Tasmania, is a broad form of *S. cultrata*, Steenstrup. It might easily be confused with the young stage of *S. afama*, Gray, except that the latter has a thicker shell above the median area, and the growth lines are convex and not sinuous, whilst the mucro of *S. cultrata* and its varieties is keeled on the ventral face.‡

ANNUAL EXHIBITION OF WILD FLOWERS.—A proposal to introduce new features into the exhibition of wild flowers, usually held early in October, is under consideration by the committee. The suggestion is to offer small prizes under certain conditions, both for collections of cut flowers and pot-grown specimens. Members interested in the latter display should lose no time in getting their exhibits into form. Details will be given in a later issue.

AUSTRALIAN ORCHIDS.—A handy illustrated volume of 63 pages, entitled "An Introduction to the Study of South Australian Orchids," by R. S. Rogers, M.A., M.D., has been issued by the Education Department of that State, at the moderate price of one shilling. Of eighty-seven species listed, thirty-seven are figured (two in colours), so that Victorian students of this interesting group of plants will find the publication extremely useful, as many genera, as also species, are common to both States. In addition to a glossary of terms, biographical sketches with portraits are given of Robert Brown, Ralph Tate, and R. D. Fitzgerald, famous investigators of the flora of Australia.

* Quoy and Gaimard, Zool. Voy. de *L'Astrolabe*, vol. ii. (1832), p. 68; Atlas, pl. ii., figs. 2, 11.

† Proc. Linn. Soc. N. S. Wales, vol. xxvi., part 3 (1901), p. 351.

‡ See Chall. Rep., Zool., vol. xvi. (1886), p. 135, woodcut, fig. 5.

THE DISTRIBUTION OF LEAF GLANDS IN SOME
VICTORIAN ACACIAS.

BY A. D. HARDY, F.L.S., F.R.M.S.

(With Plate.)

(Read before the Field Naturalists' Club of Victoria, 13th May, 1912.)

THE glands of the acacias have received, generally, little notice, but a few botanists¹ have drawn attention to them in describing several species, and one² has referred frequently to this feature in his systematic arrangement of the Australian species of the genus as an auxiliary rather than as an essential character in specific diagnosis. In one case, to be referred to later, the gland has been given undue importance where associated with an apparently supernumerary nerve connecting it with the midrib. Notwithstanding the provincial aspect of the title given to it, this paper includes reference to a number of extra-Victorian species of interest, and for this I am indebted to Professor Ewart, D.Sc., Government Botanist of Victoria, who made the National Herbarium collection available for examination, and also to Mr. J. Cronin, Director of the Botanic Gardens, Melbourne, by whose permission I am enabled to exhibit several of the specimens.

BIPINNATÆ—Of the two easily recognizable divisions of the genus—viz., the bipinnatæ (or feather-leaved acacias) and the phyllodineæ (or "flat-leaved" species), we may first notice the former. In referring to these I will avoid the use of the term "common petiole," and regard the leaf as composed of the petiole and its production, the rhachis, the latter bearing the pinnæ, which, in turn, support the leaflets. The commonest occurrence of the glands in the bipinnate species is as a suite, of which one is to be found on the petiole, slightly removed from and below the first pair of pinnæ, and the remainder distributed along the rhachis—one at or just below the base of each pair. But, although the simple suite is evidently the normal condition, there is only approximate constancy, since the examination of any tree in any locality, or even one small branch, will almost surely disclose leaves with superfluous glands, or perhaps with some missing, the former case being more frequent. In this my experience confirms Mr. Maiden's record³ in connection with the varieties of *A. decurrens*. To these, in this connection, may be added *A. Baileyana*, *A. spectabilis*, &c. Bentham² remarks that "the glands on the upper edge of the phyllodia and in the common petiole of the compound leaf seldom afford even a specific distinction." Of the exceptions, *A. decurrens*, var. *panciglandulosa*, F v. M., may be mentioned as a variety founded partly on the numerical inferiority of the glands.

There are some bipinnate species which normally carry only the lowest and the uppermost glands, the rhachial internodes (between the bases of the other pairs of pinnae) being without them. This applies to *A. elata* (the "Cedar Wattle" or "Pepper-tree Acacia") and *A. discolor* (the "Sunshine Wattle"). In *A. elata*, which has leaves more than a foot in length, the petiole is often more than four inches long and the rhachis more than six inches. Here the petiolar gland is a prominent cushion, with conspicuous pore, and situated nearer the lowest pinnae than the leaf base, but remote from both and, although there is sometimes a smaller gland near the end of the rhachis, below the base of the terminal pair of pinnae, it is more often absent from Victorian-grown trees examined by me. *A. Baileyana* has very small leaves with comparatively large glands, and frequently the petiolar gland is undeveloped. Indeed, there is often no room for it when the lowest pair of pinnae spring from the base of the leaf, which thus has no bare petiole. In *A. discolor* we have, as far as my experience shows, a greater variety in the petiolar gland, which, normally about $\frac{1}{5}$ -inch long, sometimes extends to $\frac{1}{4}$ -inch; or two may be longitudinally adjacent, or, again, two may be laterally contiguous, while the small round gland near the base of the terminal pair of pinnae is generally present (Plate, fig. 1). In the varieties of *A. decurrens*, including *normalis*, *dealbata*, and *mollis*, as already remarked, there is some, but less noticeable, inconstancy. There may be rhachial internodes with no gland at all, or such spaces may contain two, and these not necessarily near the pinnae bases, but midway between or dividing the spaces into thirds. Especially in var. *mollis*, in my garden at Kew, one may notice the large number of leaves in which there are two glands to each internode of the rhachis. In plants of this variety, also, I have occasionally found two glands on the rhachis laterally adjacent (fig. 3). In passing, I may mention that in the leaves of the Cape Wattle—which, however, is not an acacia, and is botanically known as *Albizzia lophanta*—the beautifully-feathered leaves have a prominent petiolar gland and one near the end of the rhachis, thus resembling *Acacia elata* more than the varieties of *A. decurrens*.

In the development of the leaf the gland is distinctly precocious. In *A. elata*, &c., long before the pinnae have spread their leaflets, the gland, with its pore, is prominent. Indeed, it is well in evidence before the young leaf has disengaged from their warm, hirsute, mutual embrace the unexpanded pinnae: but on this point and others I hope to have some notes to offer at a later date.

JUVENILE PLANTS AND REVERSIONARY FOLIAGE.—In passing from the bipinnate forms to the Phyllodineæ, we may note, a

an appropriate link, the bipinnate juvenile foliage of the young plants of the latter. Species such as *A. melanoxylon*, *A. implexa*, *A. pycnantha*, and many others have ordinary bipinnate foliage when young, and, occasionally, reversionary foliage of this character may be produced on a branch of an adult tree bearing, normally, phyllodia only, as the result of injury—a local “second childhood”! As we know the phyllode to be a modification of the vertically expanded petiole and rhachis, or petiole only, we look for the gland on the upper edge of the expansion or ala of the transition leaf. In all cases examined by me the gland was situated at or near the base, and none was found along the rhachis, from which it might appear that, in the reduction of the bipinnate leaf to the bare phyllode, there is, in the evolutionary process, a precedent loss of the rhachial glands.

PHYLLODIA OF MATURE PLANTS.—Next we may turn to the phyllodia of mature plants and find that the position of the gland varies, but with a fair amount of constancy in certain species, while in others the variability is more marked. In *A. longifolia*, var. *sophorae*, a count of many hundreds showed 3 per cent. nearer $\frac{1}{8}$ -inch from the base than the prevailing $\frac{1}{4}$ -inch. Generally speaking, the species with long phyllodes—e.g., spp. *Maideni*, *stenophylla*, *linearis*, *cyanophylla*, *saligna*—have the gland at or near the base, while the cases in which the single gland is further removed may be observed in phyllodes having, in proportion to length, a greater breadth—e.g., spp. *podalyræfolia* (with almost broad-elliptical phyllodes), *myrtifolia*, and *A. cultriformis* and *A. pravissima* (with small, broad, angular or sub-angular, oblique phyllodes), but, like many other rules, this has its exceptions.

Certain species show uncertainty as to both number and position of the glands. Thus, in *A. amœna* (fig. 7) there may be only one, more often two or three and sometimes four, rarely five. In this species, when only one gland is present, it is, probably without exception, nearer the base than the apex. If two glands are borne they may be both below the middle, or may be roughly equidistant from base and apex respectively—e.g., *A. decora* (fig. 10)—while three may divide the phyllode margin into four about-equal parts.

Glands do not appear doubled on the phyllode margin so frequently (if at all) as on the rhachial ridge (fig. 19) of the compound leaf.

It is improbable that in Australian acacias more than five glands are to be found on one phyllode, though five have been noted on specimens of *A. amœna* by the present writer. This brings us to a case of variation, in which the gland may be close to the base and so subordinated as to be almost lost to

sight, or conspicuously situated on the margin, remote from the base, and with an equally conspicuous short, oblique nerve or vein connecting it to the midrib. Within my experience this latter occurs only in species included in Bentham's series Uninerves, the few examples at present available being *A. penninervis*, *A. pycnantha*, *A. obtusata*, and *A. decora*, but there may be others, especially amongst the smaller-leaved Uninerves, in which it could be detected only with difficulty. This oblique nerve, as of diagnostic value, has been made too prominent in description of *A. penninervis* in his "Key" by F. von Mueller,⁴ and I prefer the more guarded language of Bentham,⁵ for since, as I now believe, I erroneously recorded⁶ *A. pycnantha* for a locality in the North-Eastern province of Victoria, I have taken special note of hundreds of plants of both this species and of *A. penninervis*, and am convinced that, although in *A. penninervis*, especially its variety *falciformis*, the supra-basal nerve is often present, whole trees may be examined in some localities, and the marginal gland found to have, where remote from the base, no prominent nerve, or to be so near the base as to render the nerve invisible. In *A. pycnantha*, on the other hand, no oblique nerve of the kind has been mentioned, so far as I am aware; yet, in the National Herbarium collection and my own there are specimens showing the nerve distinctly, and the fresh twig taken at random from a tree in Studley Park, Kew, shows the oblique nerve well developed. Specimens of *A. pycnantha* from dry, auriferous districts of Victoria, such as that from near Maldon exhibited, often show not only the feature above-mentioned but also a second gland much higher up—near the middle. Hence, although *A. penninervis* and *A. pycnantha* may, as a rule, be readily recognized by all but the novice in the field, and in the fruiting hand-specimens, it becomes a matter of difficulty to discriminate among fruitless herbarium material. If anything, the more nerve-like margins of the former, the higher relief of its secondary venation and its often glaucous appearance hold good, and I have examined many trees bearing, amongst others, abundant phyllodia the upper margins of which bore, in addition to a nerveless gland near the base, from one to five minute denticles or prickles at irregular intervals. These last I have never seen in *A. pycnantha*.

Another species, *A. alata*, which, through slovenly pronunciation of the specific name, is often confused with *A. elata*, and than which, perhaps, no other species is more unlike—may be referred to. This species has decurrent phyllodes alternating, and thus giving the branches a winged appearance (hence the name). Excepting the decurrent part, the phyllode is only a little

longer than broad, and the upper margin has usually a distinct median angle surmounted by a small but prominent and somewhat trumpet-shaped gland.

Other species with the gland well advanced from the base are *cultiformis* and *pravissima*. The former, known as the "Knife-leaved Acacia," has very heteromorphous phyllodes, and the position of the gland varies accordingly. When the upper margin is only gently curved the gland is more often nearer the base than when there is a pronounced curve of small radius, as in the latter case the gland is usually above this prominence. In *A. pravissima* there is a fairly constant, distinct angle or abrupt curve about the middle of the upper margin, and the gland is situated below this—usually about half-way to the base, despite the varying shape of phyllode.

Of the prickly acacias two may be mentioned—*A. juniperina* and *A. verticillata*—the two being well separated in systematic arrangement. In the absence of fruit and bloom, they bear a strong resemblance to each other, the main distinction being the pseudo-whorls of small rigid phyllodes of the latter and the scattered, slightly larger phyllodes of the former. *A. verticillata* has the gland usually about half-way along the phyllode, which is about $\frac{1}{4}$ -inch long, and *A. juniperina* has it almost constantly near the base.

In a large number of the more xerophilous species, especially those of the series Calamiformes, from North-West Victoria, the marginal gland is either absent or very inconspicuous, even when a hand lens is used. *A. rigens* and *A. calamitolia* are two of the exceptions, the gland being easily discernible.

SUMMARY.—Glands in the genus *Acacia* are wanting in few species, if any. They are to be found almost exclusively on the acrosopic or upper edge of the petiole or rhachis, or phyllode. In Bipinnatae they are in greatest quantity, most frequently a gland for each pair of pinnæ, situated close below its base. They develop early in the life of the leaf. In the Phyllodineæ the position is usually below the middle and generally near the base of the phyllode where the latter are very long, while in much proportionately-broader leaves the gland is usually higher up. Certain species are prone to bear two or more glands, and several have an auxiliary nerve connecting the marginal gland obliquely to the midrib, but this feature is inconstant, and apparently restricted to species of series Uninerves. Glands are absent from or most inconspicuous in species chiefly of the Calamiformes and others having for habitat the drier north-west districts of Victoria, though exceptions are given.

The following list gives approximately the groups into which many of the acacias fall if the usual location of the gland is taken as a guide.

TABLE showing distance from base of phyllode, at which the single gland (or the first of the series if more than one) is usually found, with the length of the phyllode, where measured, in brackets:—

$\frac{1}{6}$ to $\frac{1}{8}$	triptera.	
(More often $\frac{1}{6}$).	verniciiflora (4).	
*acinacea ($\frac{1}{2}$).	Wattsiana	
armata, $\frac{1}{6}$ ($\frac{3}{4}$).	$\frac{1}{4}$ +	
calamifolia, $\frac{1}{6}$ ($1\frac{1}{2}$).	Dallachiana ($4\frac{1}{2}$).	
continua.	*decora ($\frac{3}{4}$).	
diffusa ($1\frac{1}{2}$).	glaucescens.	
diptera.	glaucoptera.	
doratoxylon.	implexa (4).	
glandulicarpa ($\frac{3}{4}$).	*linearis.	
lanigera, $\frac{1}{8}$ ($1\frac{1}{2}$).	*longifolia (4-5).	
leprosa ($2\frac{1}{2}$).	lunata (1).	
lineata ($2\frac{1}{2}$).	melanoxylon ($3\frac{1}{2}$).	
†Oswald.	obliqua.	
prominens ($1\frac{1}{4}$), $\frac{1}{3}$.	prominens, $\frac{1}{10}-\frac{4}{10}$ ($1\frac{1}{2}$).	
retinodes ($4\frac{1}{2}$).	salicina, $\frac{1}{4}-\frac{1}{2}$ (4).	
*rigens (2).	†torulosa.	
saligna	†tnmida.	
stenoptera, $\frac{1}{8}$ ($1\frac{1}{2}$).	Wattsiana	
†strongylophylla.	$\frac{1}{2}$ +	
verticillata, $\frac{1}{8}$ ($\frac{1}{2}$).	*amœna ($1\frac{1}{2}$).	
$\frac{1}{6}$ to $\frac{1}{8}$	brachybotrya ($1\frac{1}{4}$).	
(More often $\frac{1}{6}$).	Hakeoides.	
*alata, $\frac{1}{8}-\frac{1}{4}$.	linearis (6).	
alpina.	*myrtifolia ($1\frac{1}{2}$).	
*amœna (2).	*penninervis (4).	
aneura (3).	*pycnantha (4).	
cyanophylla (6).	salicina (4).	
diptera.	stipulosa.	
elongata.	$\frac{3}{4}$ +	
farinosa.	*linearis, $\frac{1}{2}-1''$ ($3-6\frac{1}{2}$).	
Howitti.	*obtusa ($2\frac{1}{2}$).	
*juniperima ($\frac{3}{4}$).	*penninervis (4).	
macradenia (6).	*pycnantha (5).	
*Maideni (4-6).	salicina.	
montana ($\frac{3}{4}$).	At base.	
oxycedrus (1).	colletioides ($\frac{1}{2}$).	
pendula ($3\frac{1}{2}$).	*pycnantha.	
*pycnantha ($\frac{1}{8}-\frac{3}{4}$).	rupicola, $\frac{1}{8}$ ($\frac{1}{2}$); &c.	
retinodes ($4\frac{1}{2}$).	Very variable.	
saligna (6).	*cultriformis.	
sclerophylla.	*penninervis.	
siculiformis (1).	*pravissima.	
*stenophylla ($1\frac{1}{2}$).	*pycnantha.	
†stipuligera.	Often with oblique nerves from near base of midrib to a marginal gland.	
stricta (3).	*decora.	
suaveolens (2).	obtusata.	
†subporosa.	*penninervis.	
tenuifolia, $\frac{1}{10}$ ($\frac{1}{2}$).	*pycnantha.	
torulosa.		
trineura.		

* Mentioned in text.

† From Mueller's "Iconography."

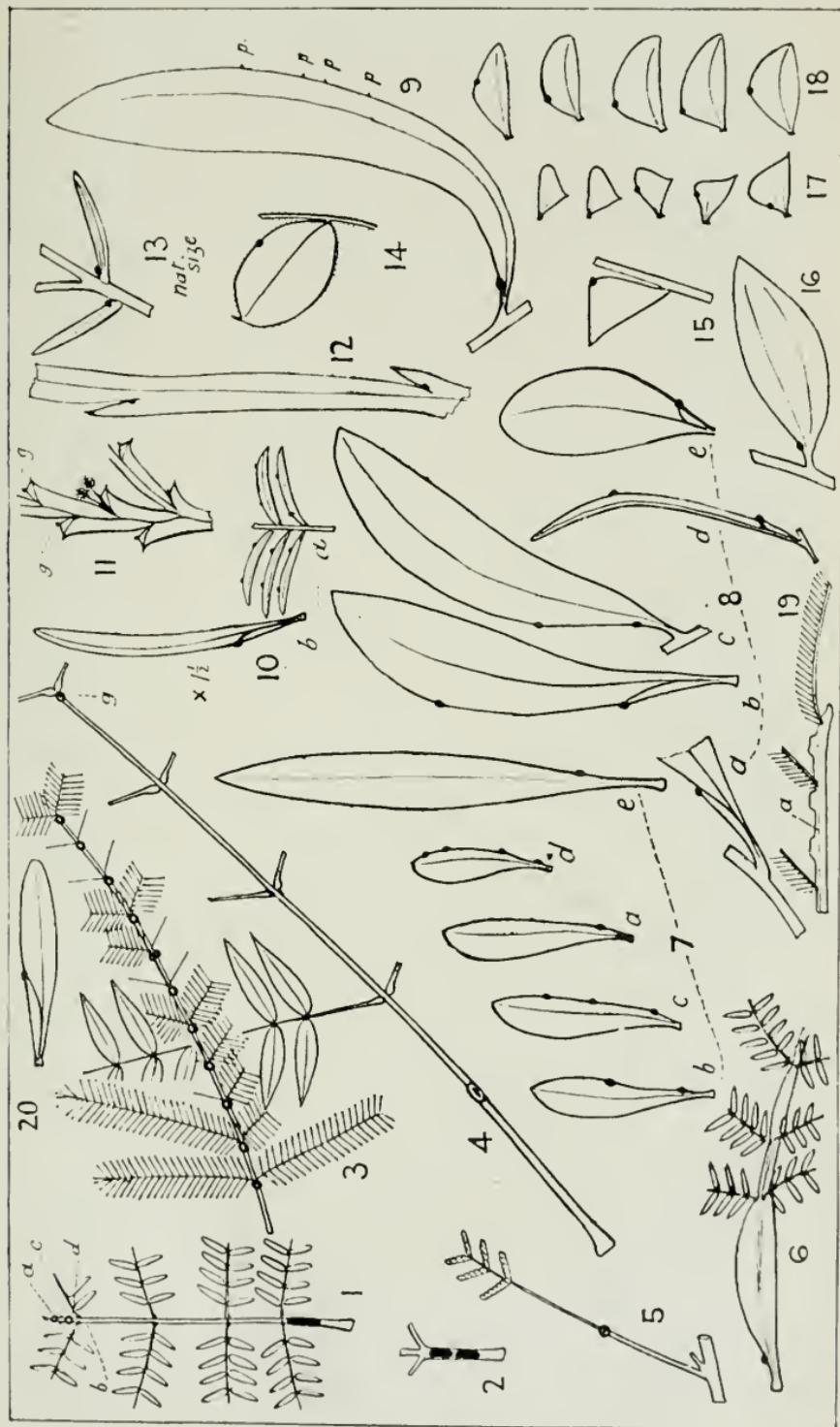
DESCRIPTION OF PLATE.

NOTE.—The figures have been reduced to half-size, excepting 2, 13, 19, and 10B, and are diagrammatic in detail, the glands especially having been given undue prominence.

1. *A. discolor*, showing one elongated petiolar gland and two (*a* and *d*) developed on the prolongation of the rhachis beyond the uppermost pair of pinnæ, which, taken with the absence of a gland at *b*, point to the non-production or abortion of pinnæ at *c*.
2. *A. discolor*, showing two petiolar glands.
3. *A. decurrens*, var. *normalis*, showing suite of glands, but with a lateral supernumerary at one point.
4. *A. elata*, with a petiolar and a sub-terminal gland.
5. *A. elata* (young), petiolar gland well developed, but sub-terminal gland not shown, though present immaturely.
6. *A. implexa* (transitional foliage)—one gland only, near base of vertically dilated petiole.
7. *A. amœna* (from specimens in National Herbarium)—*b*, from Gippsland, Victoria; *d*, from Delegete, Victoria.
8. *A. pycnantha*—*a* and *c*, from Studley Park, Kew, Victoria; *b*, from N.W. Victoria; *d* and *e*, from specimens in National Herbarium, the latter from Buchan, Victoria.
9. *A. penninervis*, without oblique supra-basal nerve, and showing minute denticles at *p*.
10. *A. decora* (Botanic Gardens, Melbourne), showing normally two glands in *a*, and in *b* (enlarged) one gland only (rare), with oblique nerve (frequent).
11. *A. alata*, with gland surmounting a prominent aeroscopic angle of decurrent phyllode.
12. *A. diptera* (in National Herbarium), with decurrent phyllodes bearing glands almost concealed in axils.
13. *A. colletioides* (in National Herbarium), natural size.
14. *A. podalyræfolia*, Botanical Gardens.
15. *A. stipulosa* (after F. v. M.¹)
16. *A. stipuligera* (after F. v. M.¹)
17. *A. pravissima*, Acheron Valley, Victoria.
18. *A. cultiformis*, cultivated, Kew, Victoria.
19. *A. decurrens*, var. *mollis*, side view, to show glandiferous rhachial ridge.
20. *A. obtusata* (in National Herbarium), with oblique nerve to marginal gland.

REFERENCES.

- ¹ F. v. Mueller—"Iconography of Australian Species of *Acacia*."
J. H. Maiden—"Forest Flora, New South Wales—Wattles and Wattle Bark."
- ² Bentham and Mueller—"Flora Australiensis," 1864.
C. Moore and E. Betché—"Handbook of the Flora of New South Wales."
- F. M. Bailey—"The Queensland Flora," 1900.
- J. H. Maiden—"Forest Flora, New South Wales."
- F. v. Mueller—"Key to the System of Victorian Plants," 1887-8.
- Bentham and Mueller (*loc. cit.*)
- A. D. Hardy—"A Tramp from Healesville to Buxton," *Victorian Naturalist*, xxii. (1906), p. 163.



A. D. II. ad nat. del. (ex 15 & 16).

GLANDS OF ACACIAS
($\frac{1}{2}$ nat. size, excepting 2, 13, 19, and 10b, enlarged)

The Victorian Naturalist.

VOL. XXIX.—No. 3.

JULY 4, 1912.

No. 343.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE thirty-second annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th June, 1912.

The president, Mr. F. Wisewould, occupied the chair, and about 50 members and visitors were present.

REPORTS.

It was reported that the excursion arranged for West Essendon, on Saturday, 25th May, had to be abandoned, on account of inclement weather.

A report of the visit to the National Herbarium on Saturday, 8th June, was given by Mr. J. R. Tovey, who acted as leader in the unavoidable absence of Professor Ewart, D.Sc., Government Botanist. There had been a fair attendance of members, and their attention was directed to the method of arrangement and classification of the specimens, which now exceed one million sheets of flowering plants and ferns. Some of the notable specimens in the Herbarium were exhibited, such as a set of plants from Petiver's herbarium, collected over 200 years ago, and plants collected in Australia by Robert Brown during the years 1802-5, both of which are still in a good state of preservation. Some attention was also devoted to the library, which now contains over 8,000 volumes, including many splendidly illustrated works and a valuable series of pre-Linnean books.

A report of the junior excursion to the Zoological Gardens on Saturday, 1st June, was given by the leader, Mr. J. A. Leach, M.Sc., who stated that there had been a good attendance of juniors, and a profitable and instructive afternoon had been spent.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. A. D. Selby, Berrigan, N.S.W., was duly elected as a country member of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. A. D. Hardy, F.L.S., read the thirty-second annual report, for the year 1911-12, which was as follows :—

“ TO THE MEMBERS OF THE FIELD NATURALISTS' CLUB OF VICTORIA.

“ Ladies and Gentlemen,—In presenting their report for the thirty-second year of the Club's work, ending on 30th April, 1912, your committee desire to congratulate members on the

completion of a successful year, while there is yet abundant field material available, and wide scope for continued effort.

“Numerically, the strength of the Club shows a slight increase, notwithstanding the increased competition in the professions and in commercial and other employments, while the exactions of a necessarily growing military system yearly take up more of the time, especially of the youth of our community, which might otherwise be devoted to nature study. At the close of the year the total membership was 290, as compared with 282 for 1910-11. Of this total membership the composition was as follows, with the increase or decrease indicated:—Honorary members, 7; life members, 2; ordinary members, 159 (+17); country members, 66 (+6); associate members, 11 (-9); junior members, 45 (-6)—290.

“While noting with pleasure the increase, by 23, in senior members, and regretting, for the reasons already given, the loss of 15 juniors, it may be mentioned that this loss has been made good by the nomination, at the request of Mr. Hamilton Fletcher, M.A., Head Master of the Preparatory Church of England Grammar School, Melbourne, of fifteen of his pupils.

“This year, happily, we have no obituary notice. Subscribers to the Sayce Fund will be glad to learn that their subscriptions were devoted to the immediate relief of the children so suddenly orphaned by the loss of both parents, the amount subscribed having been presented in form of cheques by the hon. treasurer, while periodical instalments of a special donation by a friend, whose identity is known only to the president, are being devoted to educational purposes through Mr. Wise-would.

“The financial condition of the Club is a sound one, as will be shown presently by the hon. treasurer. Our bank credit balance is a trifle over £90. This gives a less reserve than during some years of the Club's prosperity; but it should be remembered that in those days the library was comparatively starved and the binding allowed to fall into arrears. To-day we have increased assets represented by an improved library and additional furniture for exhibition purposes, the latter having been gratuitously made by an energetic member of committee, Mr. J. Gabriel.

“Attendance at the monthly meetings averaged about 65—equal to less than half the metropolitan membership, while country members and visitors were frequently present.

“Papers read during the year numbered 22, and comprised—Zoology (birds, insects, shells, and microbiology), 9; botany, 8; and on general subjects, 5. That none was read dealing with geology is somewhat remarkable. The authors were—Messrs. J. W. Audas, F.L.S., F. G. A. Barnard, A. G. Campbell,

F. P. Dodd (Queensland), J. Gabriel, C. J. Gabriel, J. C. Goudie, A. D. Hardy, F.L.S., G. A. Keartland, R. Kelly, J. A. Kershaw, F.E.S., E. B. Nicholls, G. W. Robinson, C.E., J. Searle, P. R. H. St. John, C. S. Sutton, M.B., Ch. B., J. R. Tovey, J. J. Thomas, G. A. Waterhouse, B.Sc., F.E.S. (N.S.W.), and G. Lyell, F.E.S., G. Weindorfer (Tasmania), H. B. Williamson, G. M. Mathews, F.R.S.E. (England), and T. Iredale (England); and at the December meeting an illustrated lecture was given by Mr. P. R. H. St. John, assisted by Dr. Green and the President of the Amateur Walking and Touring Club, on a trip through East Gippsland.

"Further exchanges of publications have been effected in response to invitations from other societies, including the Royal Colonial Institute, London; the Royal Botanic Gardens, Kew; the Lloyd Library, Cincinnati, U.S.A.; and the University of California. Many applications have been regretfully refused owing to the unsuitability of the literature offered in exchange. The most recent addition is *The Austral Avian Record*, edited by Mr. Gregory Mathews, a new quarterly which should be consulted by members desirous of keeping in touch with the changes accepted or proposed in Australian ornithological nomenclature.

"The twenty-eighth volume of the *Victorian Naturalist* has been issued, with index, list of exchanges, and revised list of members. To the hon. editor, Mr. F. G. A. Barnard, the Club has again to record its thanks, as also to authors of papers and contributors of notes, to whom its continued success is due. It is to be regretted, however, that 'Natural History Notes,' which should form a strong feature of the Club's recording, are not yet at all proportionate to the membership nor the field open for observation. This is a branch that might be materially strengthened, especially by increased activity of our country members.

"To leaders of both senior and junior excursions the Club is indebted for the time and trouble devoted to this essential work. The attendance at excursions has been good, and many interesting outings have resulted.

"The annual exhibition of wild flowers was combined with a conversazione, which included a general exhibition of natural history objects, &c., and enjoyed the patronage of His Excellency the State Governor, Sir John Fuller, Bart. The Government Department of Agriculture, through the State Entomologist and the Curator of the Botanic Gardens, assisted with exhibits, and the University Departments of Botany and Geology contributed largely to the success of the meeting, which included illustrated lectures by Prof. E. W. Skeats, D.Sc., on Physiography, and Mr. J. A. Leach, M.Sc., on Birds of Australia. The whole was a success, financially and otherwise.

"A new excursion programme has been provisionally prepared as a recommendation to the incoming committee, and a Christmas excursion to the National Park at Wilson's Promontory will probably be provided for, in order that members may have an opportunity of seeing what the Park is like in its still wild state, and yet note the improvements being effected for the promotion of the security and upkeep of this potentially magnificent sanctuary. The Club has declared itself against the agistment of cattle in the Park, and has protested against its continuance. The hon. secretary to the Park Committee (Mr. J. A. Kershaw) has kindly supplied the following notes :—

"Continued progress is being made at the National Park, Wilson's Promontory. The fence separating the Park from the isthmus is now completed, and is a very substantial structure. It is seven feet high, and provided with stout wire netting and several rows of barbed wires, which render it practically vermin-proof. A number of additional native animals, including emus, wallabies, opossums, and wombats, have been introduced, and are thriving well. It is also intended to introduce, as opportunity offers, native trees and shrubs not already represented there. Arrangements are in progress to carry out further improvements, which will include rest-houses for the use of camping parties, the opening up of new tracks, and improvement of the existing ones. An additional ranger will, it is expected, be appointed to supervise the north-eastern portion of the Park. A well-formed track, extending up the northern end of the Vereker Range, has opened up some splendid fern-gullies and revealed the presence of excellent timber, while magnificent views of the surrounding country are to be obtained from the top of the range. An effort is to be made, at an early date, to establish the Lyre-bird in these gullies. The advantages of the Park for tourists are becoming more generally known. Several parties from Melbourne and country districts visited it during the Christmas and Easter holidays."

"Dr. Sutton, hon. secretary to the Plant Records Committee, reports as follows :—' Since the date of last annual meeting the Plant Names Sub-committee has held 15 meetings (38 in all since its constitution in August, 1907). Two drafts of provisionally adopted names were published in the *Journal of the Department of Agriculture of Victoria* of June and August last, and these, comprising that part of the census from Orchidaceæ to Filices, were reprinted by the Department, copies being distributed for criticism from the National Herbarium. Many of these copies have been returned with useful suggestions, and in almost every case the opinions expressed on the naming have been gratifying to the sub-committee. During the year

the sub-committee has been mostly occupied in revising the names already applied to plants in the first portion of the census, from Dilleniaceæ to Myrtaceæ. This section has now been completed, and it is expected that at least a portion of it will appear in the *Journal* of July next. Through his appointment to charge of the Agricultural School at Warragul, the services of Mr. J. P. M'Lennan have unfortunately been lost, but the sub-committee has been strengthened by the addition to its numbers of Messrs. Tovey and St. John, and is at last sanguine enough to think that the end of the most important part of its labours is within measurable distance.'

"We note with pleasure the generally sympathetic attitude of the Department of Agriculture in the matter of game protection and the protection of native animals and birds. A list of additional sanctuaries, supplied by Major Semmens, the Chief Inspector of Fisheries and Game, is as follows:—'Lake Linlithgow, Dandenong State Forest, Tragowel Swamp, Doctor's Swamp, Lake Murdeduke, Hall's Gap, Reedy Lake (Nagambie), Pyke's Creek Reservoir; No. 1 Swamp, Upper Stony Creek, and Korweinguboora Reservoir Sites (Geelong Water Supply); and Jubilee Lake Reserves, Daylesford.' There were also six private sanctuaries proclaimed from 1st May, 1911, to 30th April, 1912.'

"Though the Department and the Club are not in agreement on the quail season question, which remains a bone of contention, we are glad to record these additions to protected areas for native fauna generally."

"Two members of our Club, Mr. G. A. Keartland and Mr. A. H. E. Mattingley, have been unremitting in their efforts to secure respectively better conditions for native game and a cessation of the cruelty associated with the procuring of bird plumes and skins for purposes of millinery, &c., and much success has already been achieved."

"A movement, initiated by your Club, and now, by our invitation, led by the National Parks Association, has been started for the better control of the tea-tree foreshores of Port Phillip, and there is little doubt that during the coming year something definite will be done in response to the representations of the several kindred societies acting together."

"The Club's small subscription towards the expenses of the Mawson Antarctic Expedition was a pledge of its interest in that undertaking, and no society will look with greater interest to a successful home-coming of the explorers."

"To Messrs. Coghill and Haughton the committee is grateful for the free use of their offices at 79 Swanston-street for committee meetings."

"The hon. librarian reports as follows:—'The library has been augmented by 233 volumes and separate parts during

the year. Of that number 62 volumes and parts were purchased and 171 serial publications were received in exchange or donated. The percentage of members who made use of the library is much lower than that of last year, though there was not a very marked decrease in the number of books borrowed. A large number of unbound volumes are ready for the binder, and will probably be bound early in the coming year. Early consideration should also be given to the question of publishing a library catalogue for the use of members.'

"On behalf of the committee,

"FRANK WISEWOULD, President.
"A. D. HARDY, Hon. Secretary.

"Melbourne, 28th May, 1912."

FINANCIAL STATEMENT.

The hon. treasurer, Mr. G. Coghill, read the financial statement for 1911-12, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1911	...	...	...	...	£91 4 8
<i>„ Subscriptions—</i>					
Ordinary Members	...	£116 0 0			
Country Members	...	27 11 0			
Associates	...	6 18 0			
Juniors	...	3 14 0			
		—————	£154 3 0*		
<i>„ Victorian Naturalist—</i>					
Subscriptions and Sales	...	11 4 6			
Advertisements	...	7 15 0			
Reprints	...	4 14 5			
		—————	23 13 11		
„ Sales of Badges	...	...	...	0 8 6	
„ Conversazione	...	...	...	33 18 0	
„ Hire of Tables, &c.	...	...	...	0 15 0	
„ Subscriptions—Mawson Expedition	...	1 10 0			
„ Interest, Savings Bank Account	..	4 12 2			
		—————	219 0 7		
			—————	£310 5 3	

*Subscriptions:—Arrears, £19 9s.; 1911-12, £127 5s. 3d.; 1912-13, £7 8s. 9d.
—total £154 3s.

EXPENDITURE.

By *Victorian Naturalist*—

Printing	...	...	£94 7 11	
Illustrating	...	...	6 8 0	
Free Reprints	...	...	6 19 6	
Reprints	...	...	4 0 0	
		—————	£111 15 5	

„ *Victorian Naturalist*—

Wrapping and Posting	...	...	15 11 5	
„ Rooms—Rent and Attendance	...	...	13 10 6	
„ Library—Books	...	7 17 5		
Periodicals	...	11 11 0		
Insurance, &c.	...	1 16 7		
		—————	21 5 0	

Carried forward ...

... £162 2 4

Brought forward	...	...	...	£162	2	4
By Printing and Stationery	...	...	...	9	12	0
,, Hire of Lantern	...	...	...	1	10	0
,, Postages, &c.	...	...	...	5	17	7
,, Expenses—Conversazione	...	...	...	32	2	8
,, Badges	...	...	...	2	2	0
,, Contribution to Mawson Expedition	...	...	5	0	0	
					218	6
,, Balance—Savings Bank	...	...	89	14	10	
London Bank	...	...	2	3	10	
					91	18
					£310	5
						3

G. COGHILL, Hon. Treasurer.
20th May, 1912.

Audited and found correct.

29th May, 1912. Audited and found correct.
D. BEST,
J. STICKLAND, } Auditors.

The following statement of assets and liabilities was also read :—

ASSETS.

ASSETS.					
Balance—Savings Bank	...	...	...	£89	14 10
London Bank	...	...	...	2	3 10
				<hr/>	
Arrears of Subscriptions, &c. (£55), say	...	...	...	41	8 0
Badges on hand	...	...	...	1	13 3
Library and Furniture (Insurance Value)	...	...	...	150	0 0
				<hr/>	
				£284	19 11

LIABILITIES.

Subscriptions paid in advance	...	...	...	£8 18 3
Outstanding account	...	...	...	0 19 0
				£9 17 3

On the motion of the chairman, seconded by Mr. J. Robertson, the report and statement were adopted.

On the motion of Messrs. Coghill and Pitcher, a vote of thanks was unanimously passed to the hon. auditors, Messrs. D. Best and J. Stickland.

ELECTION OF OFFICE-BEARERS FOR 1912-13.

There being no other nomination Mr. J. A. Leach, M.Sc., was declared duly elected as president. On a ballot being taken for two vice-presidents, Mr. J. A. Kershaw, F.E.S., and Dr. C. S. Sutton were duly elected. The following office-bearers were elected without opposition:—Hon. treasurer, Mr. G. Coghill; hon. secretary, Mr. J. T. Hamilton, F.L.S.; hon editor, Mr. F. G. A. Barnard; Mr. W. G. Mackintosh was elected as hon. librarian, and Mr. J. G. O'Donoghue, as hon. assistant librarian and secretary. On a ballot being taken for five members of committee, Messrs. R. W. Armitage, B.Sc., J. Gabriel, A. D.

Hardy, F.L.S., G. A. Keartland, and F. Pitcher were duly elected.

On the motion of Mr. J. Stickland and Dr. T. S. Hall, M.A., a hearty vote of thanks was passed to the retiring office-bearers.

Mr. F. Wisewould, before retiring from the chair, thanked the members for their support during the two years he had had the pleasure of presiding over the meetings of the Club, and trusted that continued progress would mark the coming year.

Mr. J. A. Leach, M.Sc., in taking the chair, thanked the members for the confidence they had reposed in him in electing him as president, and hoped that he would be a worthy successor to the retiring president.

PAPERS READ.

1. By Mr. D. J. Mahony, M.Sc., entitled "On the Bones of the Tasmanian Devil, and other Animals, Associated with Human Remains near Warrnambool; with a Note on the Dune Sand."

The author stated that during the recent Easter holidays he had traversed several miles of the sand dunes along the coast between Warrnambool and Port Fairy, and had examined several of the kitchen middens existing among them. A jaw-bone of the Tasmanian Devil, *Sarcophilus ursinus*, had been found associated with the remains of living species of marsupials, both quite unfossilized, and looking as though they had been exposed to the weather for some years. The conditions under which they were found are unfavourable for their prolonged preservation, and a comparison with rabbit bones from the same locality, which are undoubtedly quite recent, and with human remains, which in all probability are also quite recent, leads to the conclusion that the Tasmanian Devil must have survived on the Australian continent to a very much later period than has been generally supposed.

A short discussion ensued, in which Dr. Hall, Mr. F. Chapman, A.L.S., and the chairman took part.

2. By Messrs. J. H. Gatliff and C. J. Gabriel, entitled "On a New Variety of the Marine Shell *Fasciolaria australasia*, Perry."

The authors pointed out that this shell, which is fairly common along the southern coast of Australia, exhibits so many variations from the typical form, and as one fairly constant variation had already been recorded as a variety (*coronata*), they considered that the form under notice should also receive varietal name, so as to save confusion, and perhaps elevation to specific rank by some enthusiastic species-making conchologist. They had, therefore, bestowed upon it the varietal name of *bakeri*, in honour of Mr. F. H. Baker, F.L.S., who had furnished the type specimen. A large series of shells of the specific form and its varieties was exhibited in illustration of the paper.

NATURAL HISTORY NOTES.

Dr. Hall drew attention to the vast amount of information on all branches of science contained in the "Reports of the Smithsonian Institution, U.S.A.," and said that members would do well to make increased use of them.

The hon. secretary read a note forwarded by Mr. J. Searle, in which he said that at the November meeting of the Club he exhibited a copepod, taken on the Nyora excursion, which he took to belong to a new genus, but not caring to take the responsibility of founding a new genus for the specimen, he had forwarded it to Professor G. A. Sars, of Christiania, the well-known authority on this group, who had agreed with him, and provisionally named it *Hemibaeckella searlei*.

The retiring hon. secretary (Mr. A. D. Hardy), speaking with reference to paragraphs which had appeared in the daily and weekly papers immediately after the last meeting of the Club, and which had been regarded by some as reports of the meeting, said that they had not been furnished by him, or authorized by any of the office-bearers. Moreover, they were incomplete, and to some extent incorrect.

EXHIBITS.

By Messrs. J. H. Gatliff and C. J. Gabriel.—Marine shell, *Fasciolaria australasia*, Perry; the same, var. *coronata*, Lamarck; type of *Fasciolaria australasia*, Perry, var. *bakeri*, Gatliff and Gabriel; nidamental capsules and young shells of *Fasciolaria* (in illustration of paper).

By Master Karl Glance.—Dried specimens of *Loranthus pendulus*, Sieb., and *Acacia suaveolens*, Willd., collected at Black Rock, 3rd June.

By Mr. A. D. Hardy, F.L.S.—Pollen grains of Golden Wattle, *Acacia pycnantha*, stained for microscope.

By Mr. J. Searle.—Specimens of the new copepod, *Hemibaeckella searlei*, Sars (genus and species new), taken at Nyora, November, 1911.

By Mr. J. R. Tovey.—Dried specimen of introduced plant, Ribwort Plantain, *Plantago lanceolata*, L., showing foliation of the inflorescence, collected in Government House Domain, Melbourne.

After the usual conversazione the meeting terminated.

The following exhibits were made at the May meeting, but space could not be given them in the June *Naturalist* :—

By Mr. R. W. Armitage, B.Sc.—Plants of the Peanut, *Arachis hypogaea*, grown at the Agricultural High School, Colac; sapi-sapi shells, a species of *Spondylus*, from which New Guinea

money is made, from Sudest, Papua; also money made from the shells, and photographs showing how the money is carried by the natives.

By Mr. J. W. Audas, F.L.S.—Dried specimen of *Bossiaea cordigera*, Smith, Slender Bossiaea, in flower and fruit; mosses—*Ptychomnion aviculare*, Lab. (found on decayed wood), *Meteoriump limbatum*, C. M. and Hpe. (on rocks), and *Dicranum angustinervis*, Mill. (on rocks); fungi—*Fomes australis*, Fr. (on blackwood trunks), *Daldinia concentrica*, Bolt. (on acacias), *Polystictus lilacino-gilvus*, Berk. (on rotten wood), *P. occidentalis*, Berk. (on stumps), and lichens—*Usnea barbata*, Fr., var. *strigosa* (on dead blackwoods), *Parmelia placorhodioides*, Nyl. (on dead blackwoods), *P. physodes*, L. (on rocks), *Cladonia verticillata*, Hoff. (on the ground), *Sticta (Stictina) crocata*, Ach. (on rocks), and *Cladonia (Clathrina) aggregata*, Eschw. (on rocks). All from Mount Cole, Pyrenees, in illustration of paper.

By Mr. F. G. A. Barnard.—Pot-grown specimen of fern, *Botrychium ternatum*, originally found near Oakleigh.

By Mr. F. Chapman, A.L.S.—Four species of cuttle-fish bones from Torquay—viz., *S. apama*, *S. latimanus*, *S. capensis*, and *S. braggi*—in illustration of paper.

By Mr. J. Cronin.—Flowers of the Queensland Fire-tree, *Stenocarpus sinuatus*, Endl., from trees growing in Melbourne Botanic Gardens. This is a handsome-foliaged and brilliant-flowered tree, suitable for growth in and around Melbourne. It likes a slightly sheltered position, and grows to a height of 30 to 40 feet.

By Mr. J. E. Dixon.—Nine species of reptiles from various localities, also five species of Carab beetles, recently collected at Dandenong Ranges.

By Mr. C. French, jun.—Fresh flowers of orchids *Pterostylis parviflora*, *P. pedaloglossa* (rare), and *Acianthus exsertus*, collected at Oakleigh, 12th May, 1912.

By Mr. C. J. Gabriel.—Marine shells, *Vermicularia flava*, Verco, from Tasmania; *V. weldii*, T.-Wds., from Victoria; and *V. australis*, Quoy and Gaim., from New South Wales.

By Master Karl Glancee.—Fossil star-fish, *Lovenia forbesii*, collected on junior excursion to Beaumaris.

By Mr. A. D. Hardy, F.L.S.—Foliage specimens of various acacias, showing positions of leaf-glands, in illustration of paper.

By Mr. G. A. Keartland.—Specimen of *Delma*, sp., a legless lizard, from Sydenham.

By Mr. A. H. E. Mattingley, C.M.Z.S.—Parasites (Malophaga) from White-capped Albatross.

By Master W. J. Searle.—Specimens of moth, *Teara*, sp., reared from larvæ exhibited at February meeting; also cocoon and food plant.

ON THE BONES OF THE TASMANIAN DEVIL AND
OTHER ANIMALS, ASSOCIATED WITH HUMAN
REMAINS NEAR WARRNAMBOOL: WITH A NOTE
ON THE DUNE SAND.

By D. J. MAHONY, M.Sc., F.G.S.

(Read before the Field Naturalists' Club of Victoria, 10th June, 1912.)

AMONG the sand-hills which fringe the coast between Warrnambool and Port Fairy there are many relics of aboriginal inhabitants. Ashes and blackened soil mark the sites of their camp fires; shell heaps (consisting largely of Turbo, Haliotis, and Donax) indicate one source of their food, and implements of flint and other rocks and bone witness the state of their progress towards civilization. In addition to the shells there are also numerous bones lying on the surface of the sand, many of them greatly weathered, but some in a fairly good state of preservation. Among them are the bones of the blackfellows themselves, of whales, seals, fish, and other marine animals, of birds and of animals, including the rabbit. Some of these animals were no doubt used for food by the blacks, and others chanced to die where their remains are now found, but the fact that most of them are associated with the middens indicates that a large proportion must be grouped with the other camp remains as having been accumulated by the natives. A small collection of jaws and other parts suitable for identification was made. Mr. J. A. Kershaw, F.E.S., of the National Museum, has kindly identified them for me, and I am also indebted to him for a revision of the nomenclature used in this paper. The following is his list, to which I have added the popular equivalents:—

JAWS.

<i>Macropus</i> , spp.	Two, possibly 3 species	Kangaroo
<i>Sarcophilus ursinus</i> , 1 specimen	..	Tasmanian Devil.
<i>Phascolomys mitchelli</i> , 2 specimens	..	Common Wombat.
<i>Dasyurus viverrinus</i> , 2 specimens	..	Native Cat.
<i>Trichosurus</i> (?) <i>vulpecula</i> , 2 specimens	..	Common Phalanger.
<i>Pseudochirus</i> (?) <i>peregrinus</i> , 2 specimens	..	Ring-tailed Phalanger.
<i>Perameles</i> , sp.	.. .. ..	Bandicoot.

TEETH.

Macropus, sp., probably *M. giganteus* (the Common or Grey Kangaroo) or *M. rufus* (the Great Red Kangaroo). Seven incisor teeth.

Portion of a large tooth, too imperfect for determination.

SKULL.

Mus (?) *decumanus*. Imperfect, very recent .. Rat.

SCAPULA.

(?) *Canis vulpes*, 1 specimen Fox.

Mr. Kershaw, in his note accompanying the list, remarks that the bones "are all in a more or less fragmentary condition and considerably affected by long exposure to the weather, so that it is impossible to determine the species of many of them. This particularly applies to the *Macropus* jaws, which represent two, possibly three, species, all living forms, and comparable with *M. billardieri* (the Rufous-bellied Wallaby) and *M. giganteus*. The most interesting example in the collection is that of the right mandible of *Sarcophilus ursinus*, which, from its appearance, is very recent. The single scapula belongs to a carnivore, and I have little doubt is that of a fox. The jaws of *Pseudochirus peregrinus* I have queried on account of their imperfect condition, although I have little doubt they belong to this species. The skull of the rat is very recent, dried pieces of the flesh still being attached."

All the animals in the above list are still living in Victoria except the Tasmanian Devil, and they are all indigenous except the fox. The association of the Tasmanian Devil with the other marsupial and human remains is particularly interesting, for this animal is now extinct on the Australian continent, and is confined to Tasmania as a living species.

All the available evidence points to the very recent age of these bones. They are all quite unfossilized, and are not encrusted with lime from the calcareous dune sand, but have the appearance of bones exposed for a few years to the weather. Many of the bone implements, human bones, and rabbit bones are more decomposed than those collected for identification. The rabbit is, of course, an importation of a few years ago, and all the kitchen middens appear to be fairly modern, for they rest on the superficial layers of the sand dunes, and where the deeper parts of these dunes have been exposed by the wind there are no remains of animal or man so far as could be seen. It is also very unlikely that bones exposed to the conditions prevailing in this locality would be preserved for any considerable time, even if they were covered with loose porous sand. It would appear then that the Tasmanian Devil survived till a very late period in this part of Victoria, and that it was contemporaneous with the Australian aborigine. It may possibly have been exterminated by some such natural cause as that which attacked and destroyed in such numbers the Native Cat some years ago.

The fossil remains of the Tasmanian Devil from Camperdown, Queenscliff, Baringhup, and Gisborne are exhibited in the National Museum collection. At Gisborne the bones were found in a cave in the Newer Basalt, during the geological

survey of the district, by C. D. H. Aplin, in 1857 (Quarter Sheet 7 N.W.) On this map is printed the following note by the late Sir Frederick M'Coy :—

“ NOTE.—The Bones in this Cave are all strongly adherent to the tongue, and have quite lost their animal matter. The recognizable fragments are as follow :—

“ PLACENTAL MAMMALIA.

“ *Canis Dingo*, or Wild Dog, identical with living one.

“ New Genus of Carnivorous animal.

“ IMPLACENTAL OR MARSUPIAL MAMMALIA.

“ *Diabolus (Sarcophilus) Ursinus*, Tasmanian Devil; no species of this Genus at present known living on the continent of Australia.

“ *Dasyurus viverrinus*, identical with living species.

“ *Dasyurus affinis* (M'Coy). New Species nearly as large as *D. maculatus* [the Tiger Cat], but differing in proportions.*

“ *Phalangista vulpina* [*Trichosurus vulpecula*], identical with living forms.

“ *Phalangista*.—New Species.

“ *Perameles obescula* [= *Isoodon obesculus*, the Short-nosed Bandicoot], apparently identical with living species.

“ *Hypsiprimnus* [= *Potorous*] *trisulcatus* (M'Coy).—A New Species, a little smaller than the living *H. minor* [= *Potorous tridactylus*, the Rat Kangaroo], and having only 3 sulci on large premolar in the larger jaw.

“ *Macropus*, a species nearly allied to the living *M. ualabatus* [the Black-tailed Wallaby], but distinct.”

Of these it will be noticed that *Sarcophilus ursinus*, *Dasyurus viverrinus*, *Trichosurus vulpecula*, and *Macropus*, sp., also occur at Warrnambool.

The evidence as to the very recent age of the Gisborne bones is not so clear. The remains found in the cave are certainly younger than the Newer Basalt, which is generally considered to have been erupted during the Pliocene period, but M'Coy's note on their condition may point to considerable antiquity in years, though there is no evidence of how long it took the bones to lose their “animal matter.”

In conclusion, it may be of interest to note that the sand of the dunes in this locality is formed largely of shell fragments. A sample was analyzed by Mr. P. G. W. Bayly at the Geological Survey Laboratory, giving—

* The original specimen, which is exhibited at the National Museum, bears the label:—“ *Dasyurus maculatus*, Kerr, sp. Cave near Gisborne. [The type (not figured) of M'Coy's *D. affinis*, M. S.]”

Insol. (SiO_2)	..	..	5.10 %
Al_2O_3	..	..	0.57 %
Fe_2O_3	..	..	0.87 %
CaCO_3	..	..	86.25 %
MgCO_3	..	..	6.64 %
H_2O} ..	..	..	0.41 %
P_2O_5 ..	..	..	Present
			—
	Total	..	99.84 %

The percentage of carbonate of magnesia is higher than might be expected, but this may be due to some impurity in the sample. Such a sand would be worthy of a thorough test as a fertilizer for the acid soils which prevail in many of the basaltic areas of Victoria.

ON A NEW VARIETY (VAR. *BAKERI*) OF THE MARINE SHELL *FASCIOLARIA AUSTRALASIA*, PERRY.

BY J. H. GATLIFF AND C. J. GABRIEL.

(With two Plates.)

(Read before the Field Naturalists' Club of Victoria, 10th June, 1912.)

THE following is the original description in "Conchology, or the Natural History of Shells," by George Perry (London, 1911), of *Pyrula australasia*, pl. 54, f. 4:—"Shell of an olive green, the mouth of a dark brown, rounded, streaked within. A native of New Holland and Van Diemen's Land." The figure is a good one, and depicts the front aspect of the non-coronate variety of *Fasciolaria*, which is not common on our coast.

In 1822 Lamarck, in "Anim. Sans Vert.," vol. vii., p. 120, described *Fasciolaria coronata*. His work had no figures; but in 1840 Reeve, in "Conchologia Iconica," vol. ix., pl. 6, ff. 14 (a), (b), (c), (d), gave excellent figures of the mature and young forms, and thus described the species:—"Shell fusiform, sometimes abbreviated, sometimes elongated, whorls spirally obtusely ridged throughout, concavely slanting round the upper part, nodose at the angle, nodules rather swollen, fawn or ashy-grey, encircled with two more or less obscure whitish narrow zones."

Habitat.—New Holland.

Kiener, in "Coquilles Vivantes," vol. ii., p. 13, pl. iv., fig. 2, described and figured *Fasciolaria fusiformis*, Valenciennes. The figure resembles that given by Perry, but the only longitudinal plications depicted are on the early spiral



No. 1.



No. 2.

FASCIOLARIA AUSTRALASIA, VAR. BAKERI.—GAT. I AND GAB.



No. 3.



No. 4.

VARIETIES OF FASCIOLARIA AUSTRALASIA.

PLATE IV.



No. 5.



No. 6.



No. 7.

VARIETIES OF FASCIOLARIA AUSTRALASIA.

whorls, the feature being absent on the four later whorls. His description is :—“ *F. testa elongata, fusiformi, bruneo-rubescente, transversim sulcata, interstitiis transversim et longitudinaliter striatis; apertura oblonga, fulvo-albida; labro dextra crenato, intus sulcato; columella triplicata.* ”

Habitat.—Coast of New Holland.

In the same work, Kiener, at page 9, pl. ix., fig. 4, describes and figures, apparently from the type, *Fasciolaria coronata*, Lamarck. *Habitat*.—Seas of New Holland and King Island. It is the coronated form commonly found on our shores, and the description and figure agree fairly well with Reeve's.

FASCIOLARIA AUSTRALASIA, Perry, var. *bakeri* (var. nov.)

The chief points in which this variety differs from the forms usually found are :—The spire is more elongate (this is especially noticeable in the example figures 3 and 4), the longitudinal plications are pronounced, the spiral sculpture is stronger, comprising strong riblets with from two to four well-defined intermediate threads. The interior is white. There is a whitish encircling band at the periphery, which is plainly seen on the young shells on all of the whorls, the rest of the shell being coloured light reddish-brown, with a brownish-yellow epidermis. The test of the varietal type is very solid.

Dimensions of Type of Variety.—Length, 93 mm.; breadth, 41 mm.

Locality.—Our first imperfect example was obtained at Lakes' Entrance, Gippsland, in August, 1895. The type was recently got at Anderson's Inlet, and the other forms figured were obtained by the trawler *Simplon* off Cape Howe, Victoria.

Observations.—We were at first inclined to make a new species of the typical form of the new variety, but, upon critically examining and comparing over a hundred specimens, we determined to rank it as a variety, and to figure some of the connecting variations of form that appeared to us to only entitle it to be considered as a variety. We have named it in honour of Mr. Fred. H. Baker, F.L.S., an enthusiastic collector, who furnished us with the type, which is in the collection of Mr. J. H. Gatliff.

Typical specimens of *Fasciolaria australasia*, Perry, the variety *coronata*, Lamarck, and the type of variety *bakeri*, Gatliff and Gabriel, and a series of connecting forms, are exhibited, also young forms and nidamental capsules of *Fasciolaria*. These capsules consist of two groups, each of them nine in number, one group attached above the other. We have opened one capsule laterally. The four embryonic forms it

contains are in the same position as when it was opened. These protoconchs consist of two inflated, smooth whorls, with canal fairly produced, aperture pyriform. They are white and translucent.

EXPLANATION OF PLATES.

Fig. 1.—Type, dorsal aspect, 93 x 41 mm.

Fig. 2.—Type, front aspect.

Figs. 3 and 4.—Intermediate form, connecting with *F. australasia*, 126 x 50 mm.

Fig. 5.—Intermediate form, connecting with var. *coronata*, 103 x 44 mm.

Fig. 6.—Young form, 77 x 30 mm.

Fig. 7.—Young form, 70 x 30 mm.

SOME AUSTRALIAN BOOKS WORTH READING.—From "The Dreadnought of the Darling," by C. E. W. Bean:—"The Magic Carpet.—We were crossing some low rocky ridges when all the colour seemed to fade out of the picture. It was as though the earth had suddenly fainted, or as though we were looking at it through a blue glass. . . . We had seen a few grey mulga trees before among the green scrub, but now every tree was grey. . . . The grass was the old white beards of a thick crop of spear-grass, which had sprung up two years before after heavy rain, and had been dying ever since. The only colour in the scene was where, along the road and between the grass tufts, we could see the earth; and that was a brilliant red. . . . Everyone said—'You should see this country in a good year—it's just like a wheat-field,' but, of course, we thought that was a natural exaggeration. . . . About a year later I visited that country again. It had just received a good autumn rain. The grass had not had time to reach its full height, and the country was not quite the picture that one had heard about, but it was near enough to convince one that the descriptions of it were not exaggerated. . . . A little later we drove through acres strewn thick with a sort of white daisy; in other parts the land was covered with some herb that blossomed pink and yellow. We could not tie the grass over the horse's withers, but we saw enough to believe them when they said that in some years they could."

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th July, 1912.

The president, Mr. J. A. Leach, M.Sc., occupied the chair, and about 60 members and visitors were present.

A brief report of the excursion to Gisborne and Woodend on Saturday, 22nd June, was given, in the absence of the leader, Prof. E. W. Skeats, D.Sc., by Mr. A. D. Hardy, F.L.S., who said that the party, consisting of three members and twenty-three University students, visited Mount Macedon, the Camel's Hump, and the Hanging Rock during the day's ramble of about fifteen miles. The leader had explained the geology of the country passed through, and demonstrated the relationship of the various rock formations.

Mr. A. L. Scott, in the absence of the leader, Mr. H. W. Wilson, stated that the junior excursion which was to have been held at Studley Park on Saturday, 6th July, did not take place, owing to the non-attendance of any junior members.

ELECTION OF MEMBERS.

Messrs. W. L. C. Harry, Mentone, and C. S. Dawes were elected ordinary members at the June meeting. [These names were inadvertently omitted from last month's journal.—ED. *Vict. Nat.*]

GENERAL BUSINESS.

Mr. J. R. Tovey called attention to the omission, in the current (July) *Naturalist*, of the names of two gentlemen who were elected at the previous meeting.

Messrs. G. Coghill and A. D. Hardy referred to the late publication of the *Naturalist*, which resulted in many members receiving no notice of the meeting, and asked if this could be remedied in future.

The president, in reply, said that the late issue of the July *Naturalist* was due, in a large measure, to the dilatory methods of the Postal Department.

Mr. G. A. Keartland thought that an official protest should be made to the Postal Department, and moved accordingly.

This was seconded by Mr. J. Booth, and carried.

PAPERS READ.

I. By Mr. F. Chapman, A.L.S., entitled "What are Type Specimens? How Should They be Named?"

The author pointed out the difficulties met with by students owing to type specimens being scattered about in different

museums, or in private hands, and laid particular stress on the utmost care being taken in their housing and supervision. Definitions of the more essential terms which he had introduced in preparing the catalogue of the palaeontological collections at the National Museum, Melbourne, were given ; and a new name, tectotype (with its accompanying compounds, tectoparatype and tectoplesiotype), was suggested to denote specimens used in a structural sense for the better diagnosis of genera and species.

2. By Dr. T. S. Hall, M.A., entitled "Geological Rambles along the Victorian Coast."

This took the form of a lecture, and by means of a large number of lantern slides the geology of the country adjacent to and along the Victorian coast was explained in a very interesting manner.

NATURAL HISTORY NOTES.

Dr. T. S. Hall, M.A., mentioned having a dwarf bamboo in flower, and asked if this was at all common in Victoria.

Mr. F. Pitcher said that the plant occasionally flowered in the Botanical Gardens, and that it died afterwards.

Mr. F. G. A. Barnard remarked that a pot specimen he once had also had flowered and died.

EXHIBITS.

By Mr. C. J. Gabriel.—Marine shells—*Cryptochiton stellaris*, Midd., from California; *Callochiton inornatus*, T.-Wds., from Tasmania; *Ischnochiton juloides*, Ad. and Ang., from South Australia; *Chiton exoptandus*, Bednall, from South Australia; and *Acanthochites matthewsi*, Bednall and Pilsbry, taken from the gut of a whiting, from South Australia.

By Mr. A. D. Hardy, F.L.S.—Desmid, *Cosmarium biretum*, Bréb., collected on 26th March, 1904, in a rock pool, Botanical Gardens.

By Miss Rollo.—Nest of trap-door spider.

By Mr. F. Wisewould.—Fine plants of the Native Heath, *Epacris impressa*, from Gembrook.

By Master Karl Glance.—Dried specimens of *Loranthus celastroides*, *Epacris impressa*, and *Casuarina stricta*, from Black Rock; *Eucalyptus melliodora*, from St. Kilda Park.

After the usual conversazione the meeting terminated.

FASCIOLARIA AUSTRALASIA, VAR. BAKERI.—In making up Plate III. in the July *Naturalist* the blocks for figures 1 and 2, 3 and 4 were transposed, the error not being detected until after publication. Figures 3 and 4 represent the type specimen, while 1 and 2 are an intermediate variety. Subscribers should make the necessary alterations in their copies.

AN EASTERTIDE IN THE VICTORIAN PYRENEES.

BY J. W. AUDAS, F.L.S., Assistant, National Herbarium,
Melbourne.

(Read before the Field Naturalists' Club of Victoria, 13th May, 1912.)

EASTERTIDE is not the most favourable period of the year to study our flora in the field, but the bush always exerts a magnetic influence over me, and, having a few days' vacation at that time, I no longer resisted its impelling call, and started for that portion of the Pyrenees surrounding the highest peak, Mt. Cole, 3,347 feet above sea-level. A train journey of just over one hundred miles along the Adelaide line brought me to the little township of Beaufort, where I made my headquarters, and from which place the mountain can be seen standing out prominently fourteen miles to the north-west, a good road leading right to the foot of the mountain itself.

That the district is extremely suitable for fruit-growing is evidenced by the many prosperous and healthy orchards, those of Mr. Watkins, of Belle View, and Mr. Richards, nearer the mount, being striking examples of its favourable nature. The orchardists here are still favoured by a complete absence of many pests which follow on the heels of habitation, including the destructive codlin moth, so that spraying is not yet necessary in their orchards, and the sparrow does not yet "peck their best fruit." Other birds, however, were there in great numbers and variety, such as the ubiquitous White-backed Magpie, the lesser-known and inoffensive Grey Magpie, and flocks of the White-winged Chough, *Corcorax melanorhamphus*. The large, oval mud nests of the latter bird were numerous on the branches of the Messmates, *Eucalyptus obliqua*, and I was interested in contrasting their habits of nesting with those of the Mud-Lark, or "Pee-wee," *Grallina picata*. Although both have mud nests, the former builds secure and sheltered on the leafy branches of the Messmate, while the latter hies himself to the topmost and most exposed limb of the Swamp Gum.

In the vicinity of Raglan, the neat-growing, mat-like foliage of the introduced Chamomile, *Anthemis nobilis*, with its white-rayed florets, formed round patches of deep green against the dry grey of the grass paddocks, and, in more damp and swampy places, its relative, *Cotula coronopifolia*, with curious fleshy leaves and disc-like flowers, were equally numerous. These plants are somewhat a pest, owing to the deleterious effect which they produce, when consumed by cattle, upon the milk and cream. Another noxious weed, the common Horehound, *Marrubium vulgare*, flourished exceedingly in what would seem to be very uncongenial soil—the hard, beaten ground of the roadway. On a swamp near the roadside the

elegant Potamogeton-like leaves of the aquatic plant *Ottelia ovalifolia* covered the water surface. This plant bears large flowers of pure white touched with deepest crimson in the centre, and I regretted it was not blooming, as it would have been a lovely sight, but its beauty is only to be seen during the spring-time.

On the flats near the Raglan Creek, which are mostly timbered with the Black Wattle, *Acacia decurrens*, var. *mollissima*, I noted that the trees had been ruined by what appeared at a little distance to be the ravages of a recent bush-fire, but closer investigation showed the destruction had been caused by the beetle known as the "Fire-Blight of Wattles." *Paropsis orphana*, which had eaten the epidermis, or bark, from the footstalks of the foliage, leaving only brown or scorched-looking branches behind. Although the effect was rather drastic, that all were not killed was shown by some trees sending forth fresh growth. The enemies of the wattle are numerous. They have many battles to fight in the struggle for existence, and I noted that these trees were also infected with some of the borer beetles. There are hundreds of species of these longicorn beetles in Australia, and, although their habits vary, some living upon the timber while others live upon the bark, their actions are frequently fatal to the trees. I split open some branches and collected some larvæ, which I forwarded to Mr. C. French, jun., Acting Government Entomologist, to whom I am indebted for information regarding them. He states that they were longicorn larvæ, but it would be almost impossible to say to what species they belong—most probably to the genera *Phoracantha* and *Epithora*, both very destructive to our wattles.

Along the flats of this creek were many nice clumps of shrubs, such as the Woolly Tea-tree, *Leptospermum pubescens*, which grew densely, frequently exceeding thirty feet in height, and the wild Hazel, *Pomaderris apetala*. These two grew close upon the water's edge, while a little beyond flourished thickets of the Sifting-bush or Mountain Itch, *Cassinia aculeata*, with flowers varying from white to pink, also the Silver Wattle, *Acacia dealbata*, the glaucous colouring of the latter being more pronounced than usual. I chanced upon many species of the Cyperaceæ or Sedge family growing in the more open spots along the valley of the stream, *Gahnia (Cladium) psittacorum*, the tallest of the sedges, being particularly plentiful, growing to the height of fifteen feet, and bearing panicles of from eighteen inches to two feet in length, in which the scarlet seeds could be plainly seen gradually expelling themselves from the glumes. A very near relative of this sedge, *G. Radula*, is now being put to commercial use at Ringwood, where it grows

plentifully, a factory having been established there for manufacturing it into brooms ; and, indeed, many of our sedges should, under cultivation, yield a profitable return in fibre.

Many smaller plants grew right on the water's edge, among which the purple flowers of the Self-heal, *Prunella vulgaris*, were quickly recognized, and one of the Scrophularineæ, the introduced Musk, *Mimulus moschatus*, was here very abundant : its soft, tender green leaves and yellow flowers kissed the purling waters. Many people are unaware that the *Myriogyne minuta*, a little plant which grew here profusely, and is fairly common, possesses strong sternutatory properties, and snuff could be manufactured from it—indeed, to casually inhale the perfume of its flowers is quite sufficient to bring on an attack of sneezing. The star-like blue flowers of the lowly *Isotoma fluviatilis* broke the monotony of the mud flats, being more ornamental than useful, as it is a noted poisonous plant, having a very deleterious effect upon stock. Intermixed with it, in complementary contrast, were the tiny yellow flowers of the Wood Sorrel, *Oxalis corniculata*. It was somewhat unusual to find the papilionaceous shrub *Bossiaea cordigera* blooming at this time of the year, as it usually flowers during the spring months. It was very plentiful in this district, and its habitat seems to be confined principally to this portion of our State.

In starting my ascent of Mount Cole, I made for the point where the race which supplies the township of Beaufort with water starts from a creek which has its source among the granite boulders of the mountain. The soil at first was of a black sandy nature, but higher became a grey loam, with a subsoil of clay. Although formerly densely wooded, the mountain does not now, near its base, display a great amount or variety of timbers, as the saw-millers have held unrestricted licence upon its resources for many years past : however, the Forestry Department has now put an end to this ruthless destruction. To carry out this policy the mountain has been closed against timber-getters, and the trees which have grown up during the last few years are being given a chance to develop by a judicious system of thinning out and of shaping the saplings. The trees consisted of the Apple Gum, *Eucalyptus Stuartiana*, Messmate, *E. obliqua*, Cider Gum, *E. Gunnii*, Manna Gum, *E. viminalis*, Blue Gum, *E. globulus*, Grey Box, *E. cleopatra*, and the Narrow-leaved Peppermint, *E. amygdalina*. The leaves of the latter tree presented a very dotted appearance, caused by numerous oil-glands, bearing evidence of the presence of exceptional quantities of essential oil, which is distilled principally from this eucalypt.

The shrubs were just such as one usually meets with on any

Victorian ranges, and were composed of the Large-leaved Bush-Pea, *Pultenaea daphnooides*, Heathy Parrot-Pea, *Dillwynia ericifolia*, Myrtle-leaved Acacia, *Acacia myrtifolia*, Juniper Acacia, *A. juniperina*, Prickly Moses, *A. verticillata*, Drooping Acacia, *A. retinodes*, Austral Indigo, *Indigofera australis*, Gorse Bitter-Pea, *Daviesia ulicina*, Manuka, *Leptospermum scoparium*, and Sweet Bursaria, *Bursaria spinosa*. This latter shrub bears a strong resemblance to the Privet, *Ligustrum vulgare*. Its growth varies from a small bushy shrub to a small tree, sometimes twenty-five feet in height. Its foliage must be very palatable, as cattle eat it readily, while, when in seed, the rich brown of its seed-pods forms a beautiful contrast to the bright green of its foliage. It is a plant of particularly hardy growth, flourishing in practically every part of the eastern States, and, notwithstanding as it does severe drought, should prove a valuable stand-by for fodder in pastoral areas. The large variety has smooth foliage, while the smaller varieties are frequently spinous, an attribute which probably prevents it being eaten out entirely on sheep runs. A few of the smaller plants noted were *Leucopogon virgatus*, *Hovea heterophylla*, *Amperea spartioides*, *Daviesia corymbosa*, *Xanthorrhoea minor*, *Casuarina distyla*, *Platylobium obtusangulum*, *Xerotes longifolia*, *X. Thunbergi*, *Monotoca scoparia*, *Acrotriche serrulata*, *Astrolobma humifusum*, *Tetratheca ciliata*, and *Correa speciosa*. With reference to the latter shrub, which is one well known for variety in form and habit, the specimens seen here were small plants of the red variety, varying from one to two feet in height, whereas, when collecting in the National Park, Wilson's Promontory, in November, 1908, in company with Mr. St. John, we came upon specimens fully fifteen feet in height (*Victorian Naturalist*, vol. xxv., No. 9, 1909). Although the different varieties have all been classed as *Correa speciosa*, there should, in my opinion, be some attempt at differentiating them, as, in spite of repeated experiments in cultivation by seed, they show no tendency to run into each other. For purposes of propagation it has been found more advisable to strike cuttings, as the seed varies greatly in its germinating period, taking from two to even twelve months. Such an ornamental plant has not failed to receive notice, and two varieties—the green and the red—can be seen in bloom at present in the Melbourne Botanic Gardens. In England many beautiful varieties have been raised by hybridizing.

Familiar climbers and twiners greeted my view on all sides—*Clematis aristata*, *Hardenbergia (Kennedy) monophylla* (just bursting into bloom), *Glycine clandestina*, *Comesperma volubile*, *Marianthus bignoniaceus*, *Thysanotus Patersoni*, and lastly, the parasitical climber *Cassytha melantha*, whose cord-like growths

stretched from tree to tree, generally overrunning the tops, but in many instances descending to the ground and making progress almost impossible. Its small white flowers and minute foliage were scarcely noticeable upon the harsh growing stems.

The water-race before-mentioned leaves the mountain from a gully a little below the springs, and travels in a winding course of thirty miles to Beaufort. Its progress is much impeded by growths of fresh-water algae, the Brooklime, *Gratiola Piruviana*, and débris from other vegetation, and therefore demands constant supervision to keep it clean. Ascending to the westward, I soon entered the main fern gully. Although not boasting a great variety of species, the sides showed some very fine specimens. The tree-fern *Dicksonia antarctica* reared stately heads of fronds, which, interlocking, formed a beautiful shade, affording security and seclusion to the smaller ferns growing by the edge of the rippling stream beneath them. The tender green foliage of *Lomaria capensis* made pleasing contrast to the richer tones of *L. discolor*, while the scaly stalks of *Aspidium aculeatum* shot up fiercely from a wilderness of Maiden Hair, *Adiantum aethiopicum*. Straying gleams of autumn sunlight penetrated even through this tangle of vegetation, lighting up the vivid and tender green of the mosses upon giant fern trunks, such as *Cyathophorum pennatum*, while all the rocks and fallen timber owed their beauty to the growths of *Ptychomnion aviculare*, *Meteoriump limbatum*, and other smaller mosses upon them. In just such humid places we can always expect to find fungi, and I collected some of the kidney-like growths of *Daldinia concentrica* from the stem of a Black Wattle, *Acacia decurrens*. *Polystictus occidentalis* made large patches of yellow upon dead stumps with its clusters of tiny, disc-like growths. The larger forms of *P. lilacino-gilvus* grew upon decaying wood, hiding their tender lilac lining beneath a sombre coat of brown, while the large shell-shaped species, *Fomes australis*, grew upon the Blackwood. The latter would appear to absorb somewhat the nature and colouring of its host, being a beautiful dark brown, and is very slowly consumed by fire.

About and upon everything the introduced Blackberry, *Rubus fruticosus*, grew very robustly, in places forming high kopjes of green, and, being in fruit, the birds were industriously spreading broadcast the seed. Not long ago these gullies were the haunts of numbers of wild pigs, which lived almost entirely upon the rhizomes of the Bracken Fern, *Pteris aquilina*, but they have now nearly all disappeared, having been poisoned by the arsenic in pollard laid to kill rabbits.

Of the king of Australian timbers—*Acacia melanoxylon*, the Blackwood—I was pleased to see a fair quantity growing throughout the gullies, and even on the precipitous sides right

to the mountain-top. It has been said that this tree requires plenty of root moisture, but that theory did not seem to hold when one viewed fine trees growing in the most arid positions, sheer from the crevices of granite boulders. Observation has shown that the trees grown on hilly country yield a much more handsome and valuable timber than those grown upon low-lying and damp localities; but in the latter places they appear to be the longest lived, and attain the greater dimensions. That this tree has not been much used for ornamental purposes, such as plantations and avenues, is due to the slowness of its growth. This timber can be put to a great variety of uses, being close-grained and very hard, yet still capable of being cut for the finest veneer, and taking a polished surface equal, if not superior, to that of walnut. This species of acacia is particularly susceptible to attacks of the parasitical mistletoe, *Loranthus pendulus*, which is responsible for the destruction of very many trees, and in this district I noted that they were also the involuntary hosts of another species, *L. celastroides*. The distribution of these parasites is largely attributed to the Mistletoe-bird, *Dicaeum hirundinaceum*, which feeds upon insects that infest the fruit of the mistletoe, and, flying off, wipes its bill upon another branch or tree, thus depositing the seed in any small depression or crack in the bark, where it soon springs into life, sucking its sustenance from the tissues of its unwilling victim, which eventually withers and decays. It is not generally known that Tasmania enjoys an entire immunity from the ravages of the mistletoe, and, as it is found generally throughout the other States and New Zealand, it would seem that the Mistletoe-bird does not visit that island. The Blackwood is also a ready prey to the depredations of innumerable insects, and an entomologist would probably have found them more interesting in that respect; but my attention was more particularly restricted to the large bunches of brown, woody galls, which I at first attributed to some of these pests, but closer examination showed them to be the fungus *Urymocladium Tepperianum*, recently described by Mr. D. M'Alpine. Groves of these trees, quite dead, bore silent evidence of the work of the grim destructor fire, and their formerly blackened trunks and branches had assumed another mantle of beauty in the all-embracing growths of the lichen *Usnea barbata*, var. *strigosa*, which were closely covered with their whitish-grey fruit. The absence of flowers at this time of the year is largely compensated for by the variety and beauty of the autumnal colouring of the foliage; and the fascinating tints of the Austral Mulberry, *Hedycarya Cunninghamii*, of tender pale green and golden yellow, served only to accentuate the brilliant red and vivid orange of the Blackberry.

To the ordinary observer there is just a tinge of sadness in the thought that plants which flourish all the year in their modest vestment of pale or sombre green should only attain a transitory beauty with the death of the year, but it is just one of the many processes of nature which are so necessary for the rehabilitation to follow. Even we, as Tom Moore has said, "must wither away to let others succeed."

Flourishing more generally in the gullies were great quantities of the Tough Rice-flower, *Pimelea axiflora*—a shrub which yields fibre of great strength and durability, and of which genus there are twenty species known native to Victoria, while upon higher ground grew the beautiful *Banksia marginata*, both prominent and plentiful, laden with its quaint bottle-brush-like flowers.

I now bade farewell to the beautiful gullies, and began the ascent to the top of the mount, and was able to form an opinion of the immense magnitude of the timber with which the whole area of the mountain had been covered before its giants had fallen victims to the saw-millers, for here, at an altitude probably too high to allow profitable transport, the trees were magnificent. I measured a fallen Messmate, *Eucalyptus obliqua*, typical of the standing trees, and found it to be 162 feet. This species, with the Blue Gum, *E. globulus*, were the principal timber trees noted there.

Unlike the dreary, barren appearance presented by most granite boulders, those of Mount Cole were beautiful to view, being invested by lichens and mosses. Of the former, the most abundant were *Clathrina aggregata*, *Sticta (Stictina) crocata*, *Cladonia verticillata*, *Parmelia physodes*, and *P. placorhodioides*: and of the latter, *Dicranum angustinervis* and *Rhizogonium distichum*. Of the many waterfalls on the mountain, the glorious White Falls, at the head of the main fern gully, is by far the most beautiful, where the waters, after winding secretly and circuitously among the granite boulders, descend in a central drop of, possibly, one hundred feet, with many minor cascades adding their volume from different points on either side. Thence they force their way noisily through the fern gully, in many places so hidden by the dense vegetation that their presence can only be detected by the roar of their progress. Before descending in the fall just mentioned, the waters wend their way through a cave, whose dimensions I was, unfortunately, unable to ascertain, not being provided with a lantern. However, I penetrated some distance in (by the light of matches, which were almost immediately blown out by the strong current of air rushing through the passage), and reached a point where there were passages which probably led to other caves, and returned rather reluctantly, as from my

observations of some bones found near the entrance it was possible there might be more interesting relics hidden in the further recesses. On the rugged escarpments the Coral Fern, *Gleichenia circinata*, and the Rat's-tail Fern, *Asplenium flabellifolium*, flourished exceedingly.

The visit to the cave and falls concluded my tour on Mount Cole; but some reference is due to its many excellent grasses, more principally two of the best. Kangaroo-grass, *Anthistiria ciliata*, and Wallaby-grass, *Danthonia penicillata*, var. *robusta*, which are amongst the finest grasses found in Australia. The Kangaroo-grass was flourishing near the top of the mount, due probably to the fact that, not being overstocked (there being only a few strayed cattle upon it), it was enabled to propagate. A peculiarity of this grass, and one which hinders its multiplication seriously, is the fact that it bears in its large ornamental flower-heads very few fertile seeds, and if farmers would only recognize this, and remove stock from their paddocks containing it during the spring and summer months, a valuable fodder grass would be conserved: otherwise, it is in serious danger of being eaten out. The proof of this assertion can be seen by anyone interested who will observe it flourishing along the railway enclosures, while in the adjoining paddocks scarcely a blade is to be seen. Unlike the Kangaroo-grass, the Wallaby-grass bears large quantities of seed, and, in addition, has the virtue of being deep-rooting, thus enabling it to withstand severe drought. One would infer, from its great height (growing often tall enough to hide sheep), and consequent coarseness, that it would not be favoured by stock; but they are extremely partial to it.

It had been my intention to also explore Mount Mistake, lying to the westward, as well as Mount Lonarch, further east; but the predicted wet Easter was sufficiently verified, and I was compelled to postpone their investigation until some more favourable time.

POPULAR NATURAL HISTORY.—The June *Pearson's Magazine* had quite a natural history look about it. An article on photographing baby birds was very interesting and beautifully illustrated. "A Flower Quest" described a competition between two friends as to the greatest number of wild-flowers to be gathered on a certain walk, and was well illustrated with miniature outline figures of English wayside flowers, which would probably revive pleasant memories to some of our readers; while two pages were devoted to sixteen illustrations of the life-history of a butterfly, from the caterpillar to the perfect insect.

WHAT ARE TYPE SPECIMENS? HOW SHOULD THEY BE NAMED?

BY F. CHAPMAN, A.L.S., Palaeontologist, National Museum.
(Read before the Field Naturalists' Club of Victoria, 8th July, 1912.) IN scientific work of any kind it is necessary to have a clear notion of the meaning of the terms we use, and this applies in a very special sense to the definitions of type specimens. In the first place, what is a type? To quote Dr. G. B. Goode * :—"By a type is meant a specimen which has been used by the author of a systematic paper as the basis of detailed study, and as the foundation of a specific name. In cases where a considerable number of specimens has been used, it is desirable to separate one or more as being primary types, while the other specimens, which may have been used in the same study for the purpose of comparison, may be regarded as collateral types."

Since not a few scientific workers attach an uncertain value to the terms type and cotype, the latter term often being used to mean "typical of" or "compared with," the following notes are offered to show how the fundamental kinds of type specimens may be concisely denoted by terms having strictly definite meanings. At the outset, the ideas of "type" and "typical" must be kept strictly apart, in order to avoid confusion; and it is better to use the terms "holotype" for principal type instead of "type." As regards the name for a typical form, Dr. Bather writes thus † :—"For this kind of type (central type), far removed from a type specimen, we want a name; and as the word 'type' has been stolen from us it will save confusion to avoid it altogether." That author further remarks:—"Perhaps the word 'norm,' with its adjectival form 'normal,' would give the meaning most nearly, though normal has, of course, its more literal sense of 'right angles to.' The norm of a species varies with locality or with horizon, becoming in the former case the norm of a sub-species, in the latter case the norm of a mutation."

The importance of type specimens to the worker in any group of animal or vegetable life, whether recent or fossil, cannot be overrated. That types should be treated with especial care is too obvious to speak of at length. As a case in point, the destruction by fire at the Garden Palace, Sydney, in 1882, of the W. B. Clarke collection of New South Wales fossils described by De Koninck has caused serious difficulties to Australian palaeontologists when describing similar faunas containing De Koninck's species.

* In Bull. U.S. Nat. Mus., No. 53, pt. i. (1905), p. 8.

† *Science*, 28th May, 1897, p. 844.

For the convenience of workers, type specimens should be retained in the State or country where they occur.* For their safe keeping they should be housed in a building which is reasonably beyond risk of destruction by fire. Type specimens should be incorporated in a collection which is not liable to suffer from the adverse conditions of arbitrary re-arrangement or through the ignorant handling of any person temporarily in charge, or who does not possess for a type specimen an instinctive reverence bred of knowledge and sympathy with the subject. More than once have valuable type specimens in small local museums in England been mislaid and lost through the lack of knowledge on the part of those in charge ; and it is a favourable sign to see a general willingness of such museums to part with actual types in exchange for good casts or reproductions, in order that the originals may be safely installed in a large, well-cared-for collection.

In no case should a type specimen be removed from the collection in order to satisfy the demand of an applicant far removed from the place where the type is kept, for the risk of sending the specimen by post, especially when fragile, is very great. A photograph and description would probably satisfy all requirements, especially if the photograph were taken from the point of view desired by the applicant.

When type specimens are known to be in the hands of private workers, every means should be taken, on the death of the owner, to secure a permanent place for them in a well-established museum. Prof. T. D. A. Cockerell, in his interesting article on "A Suggestion as to the Care of Types,"† proposes that museums should arrange for a fund to purchase types from private owners, but not at such a price as to make the description of new species too profitable, "with results awful to contemplate."

A good example, worthy to be followed in small countries, but perhaps hardly possible for Australia, where the chief cities are so distantly situated, is that shown by the action of the Museum Conference at Calcutta,‡ which formulated an agreement "whereby all type specimens in the various Indian museums are to be deposited in Calcutta. An exception will be made in the case of those specimens which, on account of climatic dangers, would be safer in London."

* In the case of collections of insects or other natural history specimens which could only be described by a specialist, it might be advisable to submit these under the safest conditions possible, but to stipulate for the return of the types to the country in which they were found. See T. D. A. Cockerell, *Science*, 12th Aug., 1910, pp. 205, 206.

† *Science*, 12th Aug., 1910, p. 205.

‡ See *Museums Journal*, vol. ix. (1909), p. 222.

A complete list of types to be found in each museum should be published by it, and kept up to date by periodical addenda.

DEFINITIONS OF TYPES.

The following is a selection of the most important and generally useful terms which the writer has introduced into the system used in the palaeontological collections at the National Museum, Melbourne. The term "tectotype" is new:—

PRIMARY TYPES (PROTEROTYPES).*

Holotype (Schuchert, 1897).—"A holotype in natural history is a particular individual deliberately selected by the author of a species, or it may be the only example of a species known at the time of original publication. A holotype, therefore, is always a single individual, but may embrace one or more parts, as the skin, skeleton, or other portions, such as the obverse and reverse of a natural mould. When a holotype is selected, but other specimens are also described, the latter must be known as paratypes. When no holotype is selected, and more than one specimen is described, all become cotypes. Therefore, the original material of any species cannot include a holotype and cotypes, but may include a holotype and paratype, or all may be cotypes."

"Where the sexes are different and can be distinguished, a male or female specimen should be selected as the holotype, but not both."

"A species described as new, and proving to be a synonym, does not affect the type material of the species with which it is synonymous. All such synonymous material, however, should be carefully preserved and marked as holotype or cotype under the original name, as well as under the one of which it is known to be a synonym."

"Where a holotype is founded on partial specimens, exactness can be secured by writing holotype (obverse), holotype (dorsal vertebra), holotype (right valve), &c."

Cotype (Waterhouse, redefined by Oldfield Thomas).—"A cotype is one of two or more specimens, together forming the basis of a species, no type [holotype] having been selected. No species would have both type [holotype] and cotypes, but either the former [or holotype and paratype] or two or more of the latter."

Paratype (Thomas).—"A paratype is a specimen belonging to the original series, but not the type [holotype], in cases where the author himself selected a type [holotype]. It should,

* The following and other definitions may be found in "Catalogue of Type Specimens of Fossil Invertebrates in the Dept. of Geology, U.S. Nat. Mus.," by Chas. Schuchert, Bull. No. 53, pt. i. (1905).

however, be one of the specimens mentioned or enumerated in the original description."

"A paratype may be subsequently selected as a holotype when it proves to be a new species and is not the species to which it was originally referred."—Schuchert.

SUPPLEMENTARY TYPES.

Plesiotype (Cossmann, 1904).—"An individual [of a described form], whether from the same locality or another deposit, which one compares with a species and for which one gives a new description and a new figure, is a plesiotype of that species."

Neotype (Cossmann, 1904).—"Neotype for the specimen afterwards taken as the type of a species when the original type (holotype) has been destroyed or has disappeared, with the necessary guaranty of its authenticity; but it seems indispensable that the new specimen should come from the same locality and exact horizon."

Tectotype (Chapman, 1912).—A tectotype is a specimen, fragmentary or otherwise, which is selected to elucidate the microscopic structure, internal or external, of a species or genus. It may consist, for example, of a tooth-section, a shell-flake, a sliced foraminifer, or a preparation from a fossil leaf. A tectotype may be associated, in the case of a species, with the original types (tectoparatype), or with subsequently described specimens (tectoplesiotype).

TYPICAL SPECIMENS (ICOTYPES).

Topotype (Thomas).—"A specimen collected at the exact locality or within a few miles of the place where the original type of a species was obtained."

"In palaeontology, it is further demanded that the topotype should come not only from the exact locality but also from the identical stratum that furnished the species."—Schuchert.

Homotype (Homotype, Walsingham and Durrant; redefined by Schuchert).—"A homotype is any supplementary specimen that has been carefully compared with the primary types by a worker of recognized standing in the class of organisms to which the material belongs."

Ideotype (Buckman).—Specimens "from any place except the original locality named by an author of a species after publication. When similar specimens are from the original locality they are metatypes."

REPRODUCTION OF TYPE SPECIMENS.

Plastotype (Schuchert).—"Specimens in plaster of Paris, sulphur, or lead castings, gutta-percha squeezes or electro-types" direct from the originals. Models not included.

TYPES OF GENERA.

Genotype (Schuchert). — The selected type species (not specimens) upon which the genus is based.

To give a practical illustration of the use of the type names above cited, let us take one of M'Coy's types—viz., that figured and described under the name of *Squalodon wilkinsoni*. The original specimen, a molar tooth, was first figured by Sir F. M'Coy in 1864,* and re-figured in 1875.† This tooth, forming the basis of the original description, is the holotype. Subsequently, in 1879, the same author figured and described another tooth ("anterior tooth") under the same name. This specimen, as a supplementary type, would be termed a plesiosotype, not having been used in the original description. If, however, it had been so used it would have formed either one of the two types employed, if the author had considered them of equal value in the description, and hence called cotypes; or it could have been used for comparative purposes in the original description, when it would form a paratype in conjunction with the holotype. Quite recently Dr. T. S. Hall has reviewed the position of the squalodont teeth of southern Australia and New Zealand, and, in enlarging on the diagnosis of *Squalodon wilkinsoni*, which he places, by the way, in a new genus—*Parasqualodon*, T. S. Hall—that author figures some additional specimens. Thus, in the paper and plate referred to,‡ figures 1, 3, and 4 are additional plesiosotypes. Further, since this species has been so well cared for, there would be no difficulty in choosing a neotype, did such necessity arise through disaster, for one of the plesiosotypes here enumerated could be then regarded as worthy of replacing the type as a neotype, and could be found either in the National Museum collection, in Dr. Hall's collection, or in the Geological Department of the Adelaide University.

In dealing with the subject of typical specimens, if Fate smile upon us and we be fortunate enough to find either a molar, premolar, or incisor of *Parasqualodon wilkinsoni* in the exact stratum which furnished the original holotype, at Castle Cove, Otway coast, we may term these topotypes. In the event of a recognized worker in this special group of fossils producing a similar specimen to the type, and after careful examination agreeing as to their identity, that second (compared) specimen may be defined as a homoeotype. Any further specimens from Castle Cove that had been named by M'Coy, not necessarily from the same stratum, would be metatypes; and if obtained

* *Geol. Mag.*, vol. iv. (1867), pl. viii., fig. 1.

† "Prod. Pal. Vict.," dec. ii. (1875), pl. xi., figs. 1, 1a-d.

‡ Proc. Roy. Soc. Vict., vol. xxiii. (N.S.), pt. ii. (1911), pl. xxxvi.

from any other locality—say at Waurn Ponds—ideotypes. The demise of an author would, however, put an end to the further creation of these two last supplementary types.

An institution like the British Museum, in London, might desire to possess the next best thing to a type, when a reproduction such as a wax squeeze could be sent, which would constitute a plastotype.

Lastly, the conundrum may be put : When is a type not a type ? When it is a name—as the species-name *wilkinsoni* is the genotype of Dr. Hall's new genus *Parasqualodon*.

CONGRESS OF ENTOMOLOGISTS.—The many friends of Mr. C. French, recently Government Entomologist of Victoria, will be pleased to learn that he has been selected to represent Victoria, New South Wales, and South Australia at a congress of entomologists to be held in London shortly to consider means of dealing with destructive insects. Accompanied by Mrs. French, he left for London by the mail steamer on the 17th July.

PLANT NAMES.—The July issue of the *Journal of Agriculture, Victoria*, contains a further instalment of the proposed vernacular names for Victorian plants. It comprises the orders from Dilleniaceæ (*Hibbertia*) to portion of Rutaceæ (*Boronia*). It will be noticed that the Tetrathecas are to be known as "Pink-eyes." If any flower-lover can suggest a better name the committee will be glad to have it, as well as any other criticism, as early as possible.

A NEW ZEALAND PLANT HONOURED.—At the great International Flower Show recently held in London, the *Gardeners' Chronicle* prize for the best novelty in the show was gained by a variety, *Nicholii*, of the well-known *Leptospermum scoparium*, the Manuka of New Zealand and Victoria. The plant was covered with a mass of lovely pink flowers. An interesting note as to its origin appeared in the *Australasian* of the 27th July.

A.A.A.S.—The 1913 meeting of the Australasian Association for the Advancement of Science will be held at the Melbourne University from the 7th to 14th of January next. In addition to the indoor meetings for hearing addresses, reading papers, &c., a programme of excursions and visits to places of interest will be arranged. The hon. secretary for Victoria, Dr. T. S. Hall, M.A., will be glad to enrol intending members (subscription, £1), and receive intimations of papers to be read, as early as possible. It is nearly thirteen years since the Association met in Melbourne. During this interval many leaders of science have passed away, but we trust worthy successors will be found among those taking part in the January meeting.

The Victorian Naturalist.

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SEPTEMBER 5, 1912.

No. 345.

FIELD NATURALISTS' CLUB OF VICTORIA

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 12th August, 1912.

The president, Mr. J. A. Leach, M.Sc., occupied the chair, and about 30 members and visitors were present.

CORRESPONDENCE.

From Mr. A. H. E. Mattingley, C.M.Z.S., suggesting that the Club take some share in the cost of the erection of the tablet to Matthew Flinders, by the National Parks Association, on Station Peak, You Yangs. The president stated that the committee proposed to grant £1 1s. towards that object. On the motion of Messrs. D. Best and J. Shephard, the action of the committee was endorsed.

REPORTS.

A report of the excursion to the National Museum on Saturday, 13th July, was given by the leader, Mr. J. A. Kershaw, F.E.S., who stated that about thirty members attended. The afternoon was devoted to an examination of the entomological collection, and the manner of collecting, killing, and mounting insects was dealt with.

In the absence of Mr. H. W. Wilson, leader of the excursion to the Zoological Gardens on Saturday, 10th August, a brief report of the excursion was given by Mr. F. Pitcher, who said that, favoured by good weather, a very pleasant and instructive afternoon had been spent in examining, under the leader's guidance, the large collection of birds on view there.

An account of the junior excursion to the National Museum on Saturday, 3rd August, for the study of fossils was forwarded by the leader, Mr. F. Chapman, A.L.S., palaeontologist to the Museum, who reported that a fair number of junior members, with a few seniors, assembled to learn something about fossils. A preliminary halt was made before the table of strata, where the three principal groups of fossiliferous beds were pointed out and briefly explained. The contents of the wall-cases were then examined in some detail, and the more interesting fossils selected, such as the beautiful impressions of fossil leaves from the Oligocene and Miocene of Bohemia and Bavaria, representing those modern trees the birch, poplar, maple, willow, and fig; the ferns, giant horse-tails, and the earliest seed-bearing plants of the ancient coal-fields; the elegant coiled ammonites, "pagoda stones," and the nautilus, the first two of which are now extinct; and the

fossil prawns and dragon-flies. Upon the last-named hung an interesting story of how the conditions of air and sea-shore were much the same in the secondary era as at the present day, for the dragon-flies then, as now, were sometimes overtaken by the drenching sea-spray and laid out on the wet fore-shore with wings outspread, where they were speedily covered with a layer of fine mud or ooze, which, in the course of ages, became hardened into the lithographic stone of the artist. The various kinds of fishes, with their early development of scales and teeth derived from simple bony excrescences or tubercles secreted in the skin, came in for a share of attention, and the prevalence of the enamel-scaled fishes in the middle period of geological history was noted—a group now nearly extinct, and represented only by a few fresh-water forms, as the Bony Pike of North and Central America. The modern types of food-fishes appeared in the early or middle part of the Tertiary, and some fresh (!) herrings (*Clupea*) were examined dating back to the Miocene period. One of the most interesting slabs was that showing numbers of the Cretaceous, sardine-like little fish, *Leptosomus*, a shoal of which had evidently been transfixed by the emanation of noxious gases. Other fossils claiming special attention were the excellent reproductions of the earliest known bird, *Archæopteryx*, the group of the giant sloths and armadillos, and the families of the elephants and the horses, showing what curious and slow changes took place during the Tertiary period in the form and structure of their teeth and feet. Passing on to the gallery of Australian fossils, the concluding part of the talk was given upon the comparatively recently extinct Moa-birds of New Zealand, of which there are two fine skeletons in the Museum, and upon the giant marsupials of Australia. Great interest was displayed in the specimens exhibited, and regret was expressed when the time for departure came.

ELECTIONS.

On a ballot being taken, Miss M. Mitchell, Glenferrie House, Glenferrie, was elected an ordinary member, and Miss May I. Wise, Guthridge-parade, Sale, as a country member of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard pointed out that the date of the annual exhibition of wild-flowers, as printed in the programme of meetings, would be rather late for some kinds of native flowers, and moved that an exhibition of the various species of acacia be made the feature of the next (September) meeting. The motion was seconded by Mr. P. R. H. St. John, and carried.

PAPERS.

1. By Miss J. W. Raff, M.Sc., "Notes on the Isopod *Phreatoicopsis terricola*, Spencer and Hall."

The author said that, at the time of the description of this species by Prof. Spencer and Dr. T. S. Hall, in 1896, only male specimens had been obtained. Since then specimens had been forwarded to the University from the Grampians and also from the Otways, and a careful examination of these had revealed the presence of five females. Seeing that the characteristic features of the female could not be given when the species was originally described, she had decided that it was advisable to place on record the points of difference.

Mr. J. Shephard asked if anything is known of the early stages in the life-history of *Phreatoicopsis*, such as whether they occurred in water or in the earth.

Dr. Hall, in reply, said that, unfortunately, nothing is known of the early life of this isopod.

2. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-Western Victoria," Part IV.

In this part the author dealt with the Pselaphidæ, Paussidæ, and Scydmænidæ. The first-named group were of very small size, and were usually found in ants' nests. Seventeen species were recorded for the district. Of Paussidæ, only three species had been met with. They are easily recognizable from their curious broad, flat antennæ. They also have the power of discharging, when irritated, an acrid fluid or vapour, accompanied by a slight report. The Scydmænidæ were very similar to the first-named group, and are found in similar situations. Only two species had been collected in the Birchip-Sea Lake district.

In a discussion which followed, Mr. D. Best stated that he had visited the district referred to in April, but did not consider it a promising locality for the entomologist. He asked if any member could inform him why Sea Lake and Green Lake were so named. It had been suggested to him that the latter name was due to a green haze that frequently hung over the lake.

Dr. Hall: What else could it be named?

Mr. Best, continuing, said that he had found Lake Tyrrell with no water in it, but full of sand.

Mr. J. A. Leach, M.Sc., said that he had seen water in Lake Tyrrell, but its position in the lake depended on the direction of the wind. The lake being very shallow, the water was usually found at the end towards which the wind blew.

3. By Mr. J. A. Kershaw, F.E.S., entitled "Notes on the Breeding Habits and Young of the Platypus, *Ornithorhynchus anatinus*, Shaw."

The author recorded the discovery of several burrows of the

Platypus in the banks of the Hopkins River, about twelve miles from Mortlake, Victoria. In the nest of one of these an adult female was captured, to which were firmly attached two very small embryos, which measured only about 15 mm. in length. Both the burrows and nests were described in detail. Particular stress was placed on the fact that in all the burrows examined none had an entrance below the water, but were situated so high above the usual water-line that they would only be immersed during high floods; that some of the burrows had a second outlet on high ground; and that when occupied by the animal the burrow is blocked in several places with earth. He stated that it is apparently essential that the nest be placed well beyond the reach of the water, and must be dry. In view of the extremely small size of the embryo, and the fact that it is not protected in a pouch, together with the blocking of the burrow, the author was led to conclude that the parent does not leave the nest for some time after the hatching of the young.

Specimens and photographs of the young in two stages of growth, and photographs of the nest, were exhibited in illustration of the paper.

Mr. G. A. Keartland remarked that the Platypus was at one time plentiful in the Yarra River at Heidelberg. On one occasion he had seen six in one day. He asked if there was any evidence in support of the supposed poisonous nature of the male's spur. It was alleged that a scratch was as dangerous as a snake-bite. He had been frequently scratched by the spur without ill effect.

Mr. Kershaw, replying, said that the animal never attempts to use its spur in any way, and there was no evidence to show that a scratch from the spur was dangerous.

Mr. Barnard asked if the females remained in the burrow for any length of time during the period of incubation. Did she leave it in search of food, or was she fed by the male? He mentioned that the Platypus was still fairly common in the Yarra River at Kew, and was to be seen on a summer's evening.

Mr. Kershaw stated that he was surprised to find the burrow completely blocked up at the mouth, and concluded that that was a protection against flood waters. He thought that the female must remain in the burrow for a very considerable period to prevent the embryo from being detached, which would happen were the mother to force her way through the tunnel.

Dr. T. S. Hall did not think that the blocking of the burrow would prevent water from entering, as the soil was sandy and very porous.

Mr. Leach, M.Sc., congratulated the author on his inter-

esting notes, and hinted that the obstruction at the mouth of the burrow was probably to keep water-rats out.

NATURAL HISTORY NOTES.

Mr. J. A. Kershaw, F.E.S., drew attention to his exhibit of the skin and skull of a Tasmanian Devil, *Sarcophilus ursinus*, found living at Tooborac, Victoria.

Dr. T. S. Hall referred to the fresh-looking skulls of that animal which have been found from time to time in various parts of the Western District, and said that he was inclined to believe the specimen exhibited by Mr. Kershaw was an authentic occurrence in Victoria.

Mr. G. A. Keartland mentioned that on several occasions, when rain was threatening, he had noticed flights of Magpie-Larks, *Grallina picata*, going from south-west to north-east. Rain invariably followed in about twelve hours.

Mr. T. S. Hart, M.A., forwarded a short note, accompanied by some very young seedlings of the fern *Grammitis leptophylla*, obtained at Lake Burrumbeet, near Ballarat.

EXHIBITS.

By Mr. C. French, on behalf of Department of Agriculture (Entomological Branch).—One new genus and three new species of Victorian parasitic Hymenoptera, bred by exhibitor and named by P. Cameron:—*Pegotelia collesi* (genus new), parasitic on eggs of moth, *Chelepteryx collesi*; *Limnerium teiae*, parasitic on caterpillar of Painted Apple-moth, *Teia anartoides*; *Eurytoma carbocapsae*, parasitic on pupa of Codlin-moth, *Carpocapsa pomonella*; *Pteromalus galleriae*, parasitic on pupa of Bee-moth, *Galleria mellonella*; and *Amorphota ephistiae*, parasitic on pupa of Flour-moth, *Epehestia Küehniella*.

By Dr. T. S. Hall, M.A., with the permission of Mr. E. J. Dunn, F.G.S., Director of the Geological Survey.—A Parkes-Lapworth geological microscope, in use.

By Mr. T. S. Hart, M.A.—Young seedlings of fern, *Grammitis leptophylla*, from Lake Burrumbeet, near Ballarat.

By Mr. J. A. Kershaw, F.E.S., on behalf of National Museum, Melbourne.—In illustration of paper on Platypus: two eggs collected at Seymour, 1885; two embryos collected October, 1911; photograph of same, and of older specimen found in nest, November, 1910. Skin and skull of Tasmanian Devil found living at Tooborac, Victoria, July, 1912; skull of same (incomplete) from east shore of Lake Corangamite, Victoria (obtained through Mr. J. A. Leach, M.Sc.); and portion of lower jaw of same, collected by Mr. D. J. Mahoney, M.Sc., in sand-dunes between Port Fairy and Warrnambool.

By Mr. W. G. Mackintosh.—Marine shells, *Cassis fimbriata*, from Beachport, South Australia.

By Miss J. Raff, M.Sc.—Drawings in illustration of paper on *Phreatoicopsis terricola*.

By Mr. P. R. H. St. John.—Herbarium specimens of *Eucalyptus viminalis*, Lab., var. *pluriflora*, Bentham, collected by Mr. J. G. O'Donoghue from a tree growing on bank of Moorabool River, near Geelong, June, 1912 (not previously recorded for Victoria); and *Eucalyptus leucoxylon*, F. v. M., var. *pauperita*, J. G. Brown, collected and donated to exhibitor by Mr. Walter Gill, Conservator of Forests, South Australia.

After the usual conversazione the meeting terminated.

NOTES ON THE ISOPOD, *PHREATOICOPSIS TERRICOLA*, SPENCER AND HALL.

BY JANET W. RAFF, M.Sc., Government Research Bursar in the Biological Laboratory, Melbourne University.

(Read before the Field Naturalists' Club of Victoria, 12th August, 1912.) In 1896 Professor Spencer and Dr. Hall* described a new genus of terrestrial Isopoda, on specimens from the Gellibrand River, about 20 miles south of Colac, Victoria. This new genus *Phreatoicopsis* is closely related to *Phreatoicus*, Chilton, and it contains the single species *Phreatoicopsis terricola*, Spencer and Hall. Up to the time of the description of this new species male specimens only had been obtained, so the points of difference between them and the females could not be noted. Since then specimens sent to the University by the late Mr. H. P. C. Ashworth from the Otway Forest, by Mr. A. E. Kitson, F.G.S., from Mount William (near Ararat), and by Mr. W. H. Ferguson from the Grampians, prove, on careful examination, to be the same species, and include five females. I have, therefore, at the suggestion of Dr. Hall—for whose help I am grateful—made note of the following points of difference:—

Brood Plates.—There are four pairs of brood plates situated on the ventral surface of the pereion, at the bases of the first four pairs of pereiopods. They are flat and roughly oval, and are directed slightly downwards and towards the middle line. The first pair differs from the others in that it is a double structure, each one consisting of two leaf-like lobes. The anterior lobe is the smaller, and partly overlaps the posterior, which is attached all along its upper margin to the under surface of the anterior lobe.

The second, third, and fourth pairs are equal in size, and measure about 3 mm. in length. Each plate is bordered by a narrow, transparent membrane along its free edge. Their upper and outer ends are broadly attached to the ridges at the bases of the limbs. These ridges are the elevated edges

* Proc. Roy. Soc. Vic., vol. ix., N. S., 1896, p. 12.

PLATE. V.

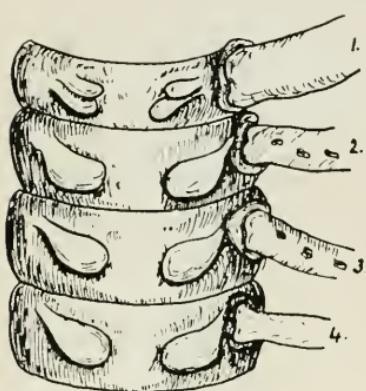


FIG. 1.



FIG. 2.

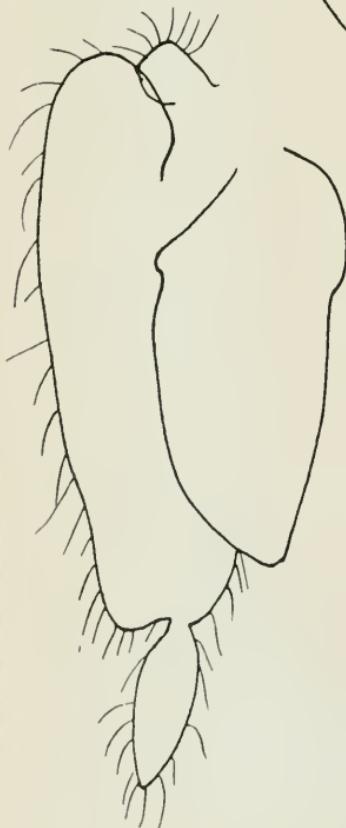


FIG. 3.

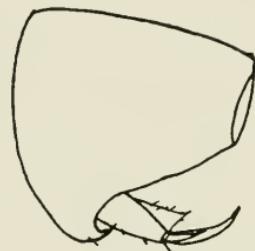


FIG. 4.

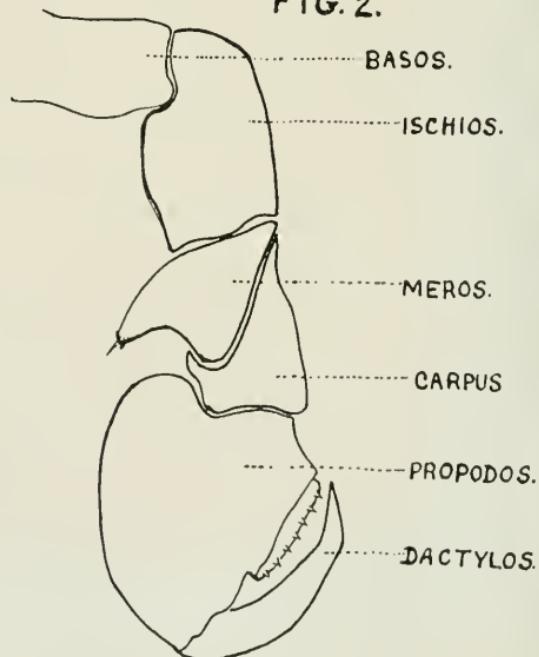


FIG. 5.

of the sockets into which the proximal ends of the pereiopods fit. Figure 1 shows roughly the position of the plates as seen from the ventral surface. The bases of the first four pereiopods of the left side only are shown.

The appendages are all similar to those of the male, with the exception of the second pleopod, which, in the male, carries the penial filament (fig. 2).

Figure 3 shows the shape of the second pleopod in the female. It is of the usual form, consisting of endopodite free from setæ, and a two-jointed exopodite bearing long setæ. At the base of the exopodite there is a small plate fringed with setæ that seems to correspond to the epipodite of the third, fourth, and fifth pleopods.

Figure 4 represents the shape of the *telson* and the right uropod, both of which are similar to those of the male.

As regards the *first pereiopod*, I have noticed a certain amount of variation in both the sexes. The one figured in Professor Spencer's and Dr. Hall's paper shows a strong tooth on the propodos and on the dactylos. Also, the meros is figured as having its process inclined upwards. These points seem generally to answer to the largest of the specimens in both sexes. Others not quite so large have the appendage more like that represented in fig. 5 of this paper, there being no teeth on the propodos or dactylos. The meros also is slightly different, the process being inclined downwards towards the propodos, not upwards. In others, again, this process projects horizontally. The downwardly inclined process seems to be the most common.

It is interesting to note the occurrence of this species in two areas so isolated from one another as the Grampians and Otways, which are about 100 miles apart. Between these two mountainous regions there is the broad valley occupied by the western volcanic plain, and to the south of this the coastal plain. The Tertiary marine deposits forming this coastal plain are found also in places below the volcanic rock, and indicate that the Otways were once isolated from the mainland as an island.*

The natural habitat of the animal is in forest country, and no specimens have hitherto been found in this broad valley, which is typically treeless and dry country.

EXPLANATION OF PLATE.

Fig. 1.—Portion of ventral surface of *Phreatoicopsis terricola* (female), showing four pairs of brood plates.

Fig. 2.—Second pleopod of male.

Fig. 3.—Second pleopod of female.

Fig. 4.—Telson.

Fig. 5.—First pereiopod.

* Hall, T. S., "Victorian Hill and Dale," p. 99.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN VICTORIA.

PART IV.*—PSELAPHIDÆ, PAUSSIDÆ, AND SCYDMÆNIDÆ.

By J. C. GOUDIE.

(Read before the Field Naturalists' Club of Victoria, 12th Aug., 1912.) In studying the minute forms of life, whether belonging to the animal or vegetable kingdoms, with the aid, say, of a Coddington lens, we are at once apprised of the fact that they are just as perfectly formed in their various parts, quite as admirably equipped for the battle of life, as the most gigantic. Although a collection of Pselaphidæ, with which we are just now concerned, has not the showy qualities of a cabinet drawer of Queensland Cetonidæ or Buprestidæ, yet in their structure and habits they are in many cases of exceptional interest to the naturalist.

As briefly defined by Kirby, the characters by which we may recognize the Pselaphidæ are as follow:—"Antennæ short and thick; elytra nearly half the length of the abdomen, which is not freely movable; tarsi generally three-jointed." To which may be added:—Size, small; colour generally of some shade of red or reddish-brown (castaneous).

This family is well represented in Australia and Tasmania, both in genera and species. All those collected by the writer, with few exceptions, have been taken in the nests of various kinds of ants, where it is probable they prey on the minute acarids (mites), which often swarm in the nests of their hosts.

When collecting from ants' nests, it is advisable to secure some of the ants, and mount them with the beetles on the same card.

To give an idea of the size of these Pselaphidæ, I may mention that *Somatipion globulifer*, Schls., one of the largest of our species, measures only 4 mm., or less than one sixth of an inch.

PSELAPHIDÆ.

1441. *Ctenistes vernalis*, King.

On one occasion the writer met with a number of this species clustered under a large stone; no ants present. *Ctenistes* and *Ctenisophus* have peculiar comb-like palpi.

1442. *Tmesiphorus formicinus*, MacL.

A comparatively large species. Taken under logs in nests of *Ponera lutea*, a narrow brownish ant about a quarter of an inch long.

* Previous parts of this paper appeared in the *Victorian Naturalist*, vol. xxvi., p. 39; xxvii., p. 153; and xxviii., p. 117.

1469. *Pselaphus geminatus*, Westw.

In this, the typical genus, the palpi are usually strongly developed, in some species being as long as the antennæ. On a foggy June morning a small nest of *Ponera lutea* proved a mine of wealth. From it were taken, besides *P. geminatus*, two other species of Pselaphidæ, two species of Scydmaenidæ, and several yellow aphides.

1477. *Gerallus punctipennis*, Schauf.

Batriscodes myrmecophilus, Lea, Proc. Roy. Soc. Vic., 1910, xxiii. (new series), part 1, p. 148.

Inhabits nests of *Ponera lutea*. Mr. Lea records it from near Sydney, associating with the same ant.

1492. *Euplectops gibbosus*, King.

A rare species, taken with *P. lutea*.

1536. *Bryaxis polita*, King.

A very minute insect, about 1 mm. in length, described as from Parramatta, New South Wales, by the late Rev. R. L. King, one of the "pioneers" in the difficult task of classifying the Pselaphidæ and Scydmaenidæ. My specimen taken under a stick in a damp spot.

Eupines flavoapicalis, Lea, loc. cit., p. 150.

Recorded from Victoria, New South Wales, and Western Australia, in nests of *Ponera lutea* and *Iridomyrmex rufoniger*. In his fine paper on "Australian and Tasmanian Pselaphidæ," recently published, Mr. A. M. Lea described eighteen new species of Eupines.

Ctenisophus impressus, Sharp.

This also appears to be a widely distributed species, occurring in the galleries of termites in New South Wales and Western Australia. I once took some specimens under the bark of a dead scrub-wattle, in company with the ant *Crematogaster laeviceps*.

1559. *Somatipion globulifer*, Schaufuss.

One of the largest of our Pselaphidæ, further distinguished by the large round terminal joint of its antennæ. Found in nests of *I. nitidus* and *C. laeviceps*. Collecting one afternoon, my brother and myself secured over twenty specimens by splitting open hollow logs in which the ants were living. Described from King George's Sound, Western Australia.

1565. *Articerus curvicornis*, Westw.

This genus is readily recognized by the elongated head, resembling somewhat the rostrum of the Curculionidæ, and by the antennæ, which are composed of a single joint. In *A. curvicornis* the antennæ are short, rounded, and flattened.

with the apex truncate. It has been found in the nests of several kinds of ants, and has a wide range, being also taken in Tasmania, where it appears to be the only species of the genus occurring there.

A. cylindricornis, Lea, *loc. cit.*, p. 174.

A. dentipes, Lea, *loc. cit.*, p. 167.

Two new species, lately described. Taken in nests of *Iridomyrmex nitidus* at Birchip. The former has also been collected at Portland by Mr. H. W. Davey, and at Gunning, New South Wales.

1567. *A. dilaticornis*, Westw.

Similar in general appearance to *A. curvicornis*, but the antennæ are rounded at apex. Taken at Geelong (Davey) and Birchip (Goudie) in ants' nests (*I. nitidus*).

A. excavipectus, Lea, *loc. cit.*, p. 169.

A new species, found at Birchip and in South Australia.

1569. *A. fortnumi*, Hope.

A. bostocki, Pasc.

A. odewahni, Pasc.

("The above synonymy is according to Dr. Schaufuss."—A. M. Lea.)

Occurs in nests of *Crematogaster laeviceps*, Birchip and South Australia.

1570. *A. gibbulus*, Sharp.

Taken in company with *I. nitidus* and *C. laeviceps*, near Birchip.

Undetermined species belonging to the following genera have also been taken in the Birchip district, viz.:—*Narcodes*, *Euplectops*, and *Palimbolus*.

PAUSSIDÆ.

The singular beetles belonging to this family will be recognized at a glance, the curious broad, flat antennæ (eleven-jointed) appearing as if cut out of thin pieces of shining brown leather. The legs also, in those species known to me, are flattened and dilated. They are all of small size, the largest being a little over half an inch in length, those found in this district being of a uniform dark reddish-brown colour, moderately shining. Some of the species have been recorded as occurring in the nests of ants, and it is probable that all are myrmecophilous. They surprise the collector who handles them alive for the first time by discharging an acrid fluid or vapour with a slight report, like the Bombardier Carab, *Pheropsophus verticalis*. There has been some speculation by

entomologists concerning this curious habit, and it has been suggested that the ants utilize the beetles as "artillery" to repel intruders! It would seem more probable, however, that the beetles exercise this faculty as a means of self-defence against the ants themselves. Masters' Catalogue records 45 species of *Arthropterus*, and Mr. Lea has described two more, one of which, *A. neglectus*, has been taken at Birchip. My specimens have all been secured while flying indoors to the light during summer evenings.

Arthropterus neglectus, Lea, loc. cit., p. 177.

1618. *A. subcylindricus*, Macl.

1621. *A. waterhousei*, Macl.

SCYDMÆNIDÆ.

The small beetles comprised in this group might at first sight be mistaken for Pselaphidæ, which they resemble in size, colour, and habits. On a closer inspection, however, it will be seen that the body is completely covered by the elytra, and the tarsi (feet) composed of five joints. The family is one of limited extent in Australia, 29 species being known, of which 12 species have only recently been described by that able and untiring entomologist, Mr. A. M. Lea. These were all recorded as being found in the nests of various species of ants. I have met with but two species in the area under review.

1631. *Scydmænus optatus*, Sharp.

A single specimen of this apparently rare species was found in the nest of a small black ant at Sea Lake.

1635 *Heterognathus carinatus*, King.

Frequently taken in nests of *Iridomyrmex nitidus*. It is widely distributed, being recorded from New South Wales and Western Australia.

THE TASMANIAN DEVIL IN VICTORIA.—The interesting problem as to whether the Tasmanian Devil, *Sarcophilus ursinus*, still exists in a wild state in Victoria is now being seriously considered. Up to the present time it has only been known to occur in Tasmania, where, like the Marsupial Wolf, or "Tiger," it is only found in the wildest and roughest parts of the country. That it once existed, not only in Victoria, but in other parts of Australia, is proved by the discovery at various times of its fossil remains. In Victoria quite perfect skulls and portions of the lower jaws have been found at

Queenscliff, Gisborne, on the surface near the shores of Lake Corangamite, near Camperdown, and, among other bones of still existing marsupials, on a kitchen midden or native camp of the aborigines, between Warrnambool and Port Fairy. These remains are now in the National Museum, and, from their appearance, are so recent that they might easily have belonged to an animal which lived but a few years ago. In discussing this matter at a recent meeting of the Field Naturalists' Club, a member stated that he had seen an animal in the Werribee Gorge, near Bacchus Marsh, which, he thought, could only be a Tasmanian Devil. Little weight was attached to this statement at the time, but, curiously enough, an animal was sent to the National Museum, Melbourne, a few days ago, which was at once recognized as a full-grown female Tasmanian Devil. It was killed at Tooborac, beyond Kilmore, about 63 miles from Melbourne. Mr. W. E. Prince, who forwarded the animal, says :—"It was got by Mr. Thomas Mason whilst wood-cutting. His dog smelt it out and attracted his attention by repeatedly barking. Upon cutting open the log he secured the specimen." The question now to be determined is whether this is an introduced specimen escaped from confinement or a survivor of the Devils which we know existed at no very distant period in Victoria. Its wild, retiring nature, which leads it to seek the seclusion of the most rugged and inaccessible localities, and its strictly nocturnal habits, are in favour of the latter theory, which is further strongly supported by the remarkably recent appearance of some of the skulls found in widely-separated localities. On the other hand, it is known that some of the travelling circuses which visit the chief country towns carry small menageries as a special attraction, and may have included some of these animals ; or the curator of some country park or other person may have introduced one or more as a novelty. Has any such animal been known to have escaped and remain uncaptured, and, if so, where and how long ago ? Mr. Le Souëf, Director of the Zoological Gardens, states that during the existence of the Zoo two or three have been known to escape from there, but all were recaptured shortly afterwards. He is not aware of any having been kept in confinement in Victoria outside the Zoo. It is an animal which, once seen, could not be mistaken. It is about the size of a bull-dog, with a rather massive head and powerful teeth, quite black in colour, with usually a white V-shaped marking across the chest, and occasionally two or three white patches on the body. During the day it inhabits hollow logs or holes in the ground, and when disturbed expresses its anger by a kind of yelling growl.—JAS. A. KER-SHAW, Acting Director, National Museum, Melbourne.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 9th September, 1912.

The president, Mr. J. A. Leach, M.Sc., occupied the chair, and about 90 members and visitors were present.

REPORTS.

A report of the excursion to the Australian Historical Museum, Federal Parliament House, on Saturday, 17th August, was given by the leader, Mr. E. A. Petherick, F.L.S., who said that there was a good attendance of members, who evinced great interest in the collection of old Australian books, &c., more especially the works descriptive of the natural history of Australia published early in the last century. The leader outlined his system of classification as applied to the bibliography of Australia.

A report of the excursion to Greensborough on Saturday, 24th August, was given by one of the leaders, Mr. G. A. Keartland, who stated that there was a fair attendance of members, and on the whole a very interesting afternoon was spent amongst the birds, though none of any great rarity was noted. The botanical leader, Mr. J. W. Audas, forwarded a report stating that the Silver Wattles, *Acacia dealbata*, were found to be in full bloom, and well worth seeing, as also were their companions on the river banks, the climbers, *Clematis microphylla* and *Hardenbergia monophylla*. The usual spring flowers, such as *Anguillaria (Wurmbea) dioica* and *Hypoxis glabella*, *Brachycome cardiocarpa*, *B. graminæa*, and *Drosera Whittakeri*, &c., were fairly plentiful. The Gold-dust Acacia, *A. acinacea*, was in particularly good condition and greatly admired. *A. diffusa* also afforded delightful bits of colour.

A report of the excursion to Evelyn on Saturday, 31st August, was given by the leader, Mr. G. Coghill, who said that, probably owing to the distance from town, only six members attended, but the party had an enjoyable ramble, the Acacias and other spring flowers being at their best.

A report of junior excursion to Heidelberg on Saturday, 7th September, was given by the leader, Mr. C. Stout, who reported a small attendance, owing to threatening weather: the afternoon had been spent in studying the geology of the district.

ELECTION OF MEMBERS.

On a ballot being taken, Master G. Bromalow, State School, Bentleigh, was duly elected as a junior member of the Club.

PAPER READ.

By Mr. J. T. Hamilton, F.L.S., entitled "Through North Gippsland to Mt. Howitt."

This took the form of a lecture, illustrated by about 80 lantern slides, in which the topography of the country along the Upper Wonnangatta River and the Main Divide was described.

At the conclusion of the lecture, Messrs. A. L. Scott, J. H. Harvey, and the President complimented the lecturer on the excellence of the slides shown.

EXHIBITS.

By Mr. E. D. Atkinson, C.E.—Fifteen species of wild flowers from Tasmania.

By Mr. G. Coghill.—Six species of acacias from Cockatoo Creek.

By Mr. C. J. Gabriel.—Marine mollusc, *Turbo jourdani*, Kiener, from Cape Leeuwin, W.A.

By Mr. J. T. Hamilton, F.L.S.—Fossil wood from Upper Dargo Valley, in illustration of lecture.

By Mr. R. Kelly.—Sixteen species of acacias from Healesville.

By Mr. G. Mowling.—Flowers of *Grevillea alpina*, &c., from plants in cultivation in his garden at Hawthorn.

By Mr. F. Pitcher, on behalf of Mr. J. Cronin, Director of Melbourne Botanic Gardens.—Blooms of the following acacias now flowering in the Melbourne Botanic Gardens:—*Acacia acinacea*, Lindl., Gold-dust Acacia; *A. armata*, R. Br., Hedge Acacia; *A. cultriformis*, A. Cunn., Knife-leaved Acacia; *A. leprosa*, Sieb., Scurfy Acacia; *A. longifolia*, var. *Sophoræ*, Coastal Acacia; *A. montana*, Benth., Mountain Acacia; *A. myrtifolia*, Willd., Myrtle-leaved Acacia; *A. oxycedrus*, Sieb., Spike Acacia; *A. pravissima*, F. v. M., Alpine Acacia; *A. prominens*, A. Cunn., Golden Rain Wattle; *A. Riceana*, Henslow, Rice Wattle; *A. spectabilis*, A. Cunn., Showy Wattle; *A. strigosa*, Link., Hairy Wattle; *A. verniciflua*, A. Cunn., Varnish Wattle. Pot-grown plants of the following Acacias (in flower):—*Acacia myrtifolia*, Willd.; *A. leprosa*, Sieb.; *A. verniciflua*, A. Cunn.; *A. alata*, R. Br., Winged Acacia; *A. suaveolens*, Willd., Sweet-scented Acacia; *A. juniperina*, Willd., Juniper Wattle; *A. rubida*, A. Cunn., Red-stemmed Wattle. Herbarium specimens of the three endemic Victorian species of acacias:—*Acacia alpina*, F. v. M., Alpine Acacia; *A. Dallachiana*, F. v. M., Dallachy's Acacia; *A. tenuifolia*, F. v. M., Slender-leaved Acacia. Specimens of the crimson-flowered *Eucalyptus platypus*, Hooker, "Malook," Western Australia.

By Mr. J. Searle.—Fossil shells from Lake Bullenmerri, near Camperdown, kindly identified by Dr. G. B. Pritchard:—*Lynopsis Beaumaris*, *Glycimeris cainozoicus*, *Corbula*, sp., *Turri-*

tella acicula, *Cardita delicatula*, *Placotrochus deltoideus*; also marsupial bones, volcanic bombs, calcareous and ferruginous concretions. Recent shells from same lake and Lake Gnotuk. living plankton obtained by tow-net in Lake Bullenmerri, 5th September, including Copepoda, Amphipoda, Rotifers, Diatoms, Desmids, Algae, &c.

By Master W. Scarle.—Moth. *Colussa denticulata*.

After the usual conversazione the meeting terminated.

SUPPLEMENTARY NOTES ON THE SANDRINGHAM FLORA.

By C. S. SUTTON, M.B.

(Read before the Field Naturalists' Club of Victoria, 11th March, 1912.)

THE reasons for the following notes are more particularly to record a number of additions to the census of the Sandringham flora, as given in my previous paper, "Notes on the Sandringham Flora" (*Vict. Nat.*, xxviii., p. 5), and, in the light of a better knowledge of the locality and the aid of a map, to more exactly define the original limits of the formation, and indicate the areas at present occupied by what remains of it; also to make some remarks concerning some of its more notable plants and plant associations, and incidentally attempt the definition of such ecological terms as may have been used.

For many of the names added to the census, I must in the first place acknowledge my indebtedness to Messrs. T. S. Hart, Charles French, jun., and P. R. H. St. John.

Mr. Hart furnished me with much interesting matter, which he has kindly permitted me to incorporate in my notes, and Messrs. French and St. John indicated to me that most interesting locality south from Oakleigh, where so many plants not met with, or only rarely met with, elsewhere in the formation are now growing. To Mr. French also I owe the opportunity of inspecting some patches and remnants of the original vegetation in the vicinity of Ashburton and Canterbury.

Dealing with the new names added to the census in a somewhat promiscuous fashion, mention will at the same time be made of other plants already noted, but now occurring perhaps only rarely.

According to Mr. Hart's notes, *Velleya paradoxa* grew on the cliff, extending from the drain south of Holyrood-street, Brighton Beach, to near where the old tea-tree begins. There also, "where a clayey soil exists, with the underlying calcareous rock sometimes exposed," were collected the Short Helmet Orchid, *Pterostylis Mackibbini*, Blunt Helmet Orchid,

P. curta, Slender Bush-pea, *Pultenaea tenuifolia*, and *Myoporum humile*.

In the railway reserve at Brighton Beach, north of the Were-street bridge, the Curved Rice-flower, *Pimelea curviflora*, once grew, and perhaps still exists. In the Hampton station yard could be found at one time the *Velleya* and the Blue Eryngo, *Eryngium rostratum*; in a paddock a little to the north the Narrow-leaved Bitter-pea, *Daviesia corymbosa*, and just outside the railway fence the Purple Diuris, *Diuris punctata*. The latter he also found between Mentone and Cheltenham. Close to the reserve at the latter place the Bulbous Fringe-lily, *Thysanotus tuberosus*, used to be found, and near by the Large Podolepis, *P. acuminata*, Spoon-leaved Sundew, *Drosera spathulata*, and the two rather uncommon orchids—the Crow Orchid, *Orthoceras strictum*, and Long-leaved Duck Orchid, *Cryptostylis longifolia*. The reserve and its vicinity was closely searched on two occasions since reading Mr. Hart's notes, without detecting any trace of these. The two spike-rushes (*Heleocharis*) were found at Sandringham, and *H. sphacelata* also at Cheltenham and Moorabbin.

The White Sunray, *Helipterum corymbiflorum*, Long-leaved Flax-lily, *Dianella longifolia*, Delicate Glycine, *Glycine clandestina*, Stout Hood-orchid, *Thelymitra epipactoides*—nearly east of the golf links, beyond the Bluff-road—Blue Aster, *Aster huegelii*. Wandering Speedwell, *Veronica peregrina*, were all at one time noted about Sandringham, *Lobelia microsperma* at Black Rock, and the Snowbush Aster, *Aster stellulatus*, at East Brighton and at Cheltenham. Quoting Mr. Hart almost *literatim*:—“About and south of the swamp on the Moorabbin-road, just south of South-road and a couple of miles or more east of Moorabbin station, I got the Slender Flowering-rush, *Nyris gracilis*, the White Velvet bush, *Lasiopteratum Baueri*, and *Myoporum humile*: the Bulrush, *Typha angustifolia*, right on the Moorabbin-road, the Common Reed, *Arundo phragmites*, near by, and in the vicinity, the Side-flowered Bladderwort, *Utricularia lateriflora*, Forked Sundew, *Drosera binata*, and Lesser Red Helmet, *Corysanthes unguiculata*. A little south-west of the junction of Centre and Moorabbin roads used to be a good spot for the Dotted Hood-orchid, *Thelymitra ixioides*. Further east, along Centre-road, I have found the Bearded Helmet-Orchid, *Pterostylis barbata*, Cockatoo Orchid, *Calycv. major*—the only example ever noticed in the district—and Slender Caladenia, *Caladenia congesta*. This latter was pronounced by the Baron a small variety, and apparently new. I never found it again. The Coral Fern, *Gleichenia circinata*, once grew in a drain just off Centre-road, also south from there and east of what we knew as the old Dandenong track—a crooked road running

south-east. The same fern occurred also some distance south of Balcombe's-road.

"The old Dandenong track beyond Dingley once yielded very fine orchids, especially a white variety of the Spider Orchid, *Caladenia Patersoni*." Mr. Hart also records the Prickly Couch-grass, *Zoysia pungens*, from Brighton Beach, Mud Dock, *Rumex bidens*, from Moorabbin, and Swamp Club-rush, *Scirpus inundatus*. Regarding the River Red Gum, *Eucalyptus rostrata*, as to the occurrence of which my own recent observations have left no doubt, Mr. Hart says they are to be found "in Caulfield—for instance, near the corner of Bambra and Glen Eira roads"; and further—"I have always regarded the gums at the Brighton Cemetery as these. My uncle, Mr. Joseph Hart, pointed out to me certain posts which he supplied in 1857 still standing (last year) in a fence in Glen Eira-road, just east of the Caulfield Town Hall." In another place he says:—"Red Gums occurred along the valley which runs north of Middle Brighton station. It occurs to me that perhaps they cease about the same place, as the drainage system departs from regular valleys and tends to many closed hollows, as at Sandringham." In a later note Mr. Hart says:—"Red Gums occur north from Hampton station and on or near the Point Nepean-road beyond Moorabbin station." It was the opinion of Mr. Joseph Hart that there were no Red Gums on the track from Balcombe's block, near the Brighton Cemetery, to Balcombe's block beyond Schnapper Point, but this old road or track used to keep the ridge further east, and this explains why they were not noticed. Apart from the Red Gums which exist plentifully on the flats about Dandenong Creek and the Yarra, and extend up the valleys of Gardiner's Creek and its branches, many of which must once have been closely associated with the plants on the fringe of the Sandringham formation, others have been noted by myself quite close to Mordialloc, on a flat surrounded by an association of *Eucalyptus viminalis*, bracken, and *Ricinocarpus pinifolius*. Again, they may be seen just off the Chesterville road and on the Point Nepean-road to the east of Highett: south from Murrumbeena, to the east of Ashburton, and on the Camberwell golf links. Though the species may thus be said to be in the formation, it is not, strictly speaking, of it.

Mr. Charles French, jun., writes to me that, on looking up his field-notes, he finds the Twin-leaved Bird Orchid, *Chiloglottis diphylla*, was fairly common at Oakleigh; that between the same place and Cheltenham he has collected the Red Hood-orchid, *Thelymitra Macmillani*, the Slender Caladenia, *C. congesta*, the Dixon Leek-orchid, *Prasophyllum Dixonii*, and the Stout Leek-orchid, *P. Frenchii*; near Cheltenham, the Wedge-

leaved *Burnettia*. *B. cuneata*; and between there and Mentone the lovely Purple *Diuris*, *D. punctata*. He further mentions that the most noticeable of our *Lobelias*, *L. simplicicaulis*, is pretty common on a flat at the back of the tram-sheds at Black Rock.

In explanation of the unlooked-for occurrence of the Golden Shaggy-pea, *Oxylobium ellipticum*, at Black Rock, Mr. Charles French writes:—"As one who helped to lay out the garden at Black Rock in 1855, I may say that this plant, together with many others obtained from the Botanic Gardens, seeded, and was carried all over the place, and you will find several eucalypts, &c., in Ebden's paddock which are also escapees." The *Oxylobium* thus cannot be regarded as belonging to Sandringham. Mr. French also remarked that he missed "the dear little Preiss Club-moss," *Selaginella Preissiana*, from the list. This has since been found in great abundance near to Heatherton.

Calochilus campestris and *Diuris palustris* were both found by Mr. Charles French, as stated in his paper on "The Orchideæ of Victoria," Vict. Nat., vol. i.—the first on the Caulfield Race-course and at Cheltenham, and the other once only near the Observatory.

The remaining additions, other than those of my own finding, have been taken from Hannaford's "Jottings" and Mueller's "Plants Indigenous to the Colony of Victoria," and for these I feel somewhat apologetic, as they should not have escaped notice in making up the census in the first place. They are:—The Oval Shepherd's Purse, *Capsella elliptica*, C. A. Meyer = *C. procumbens*, Fries. = *Stenopetalum incisifolium*, Hook., fils: the first and second names described respectively in "Pl. Indig." and the "Flora Australiensis" as occurring in "boggy, slightly saline places around Port Phillip." These authorities would perhaps be sufficient, but in Hannaford's "Jottings" we have the habitat more particularly set down as "sandy cliffs by the sea near Brighton," under *Capsella australasica*, Ferd. Mueller, figured in "Icones Plantarum," vol. iii., tab. 276, and there named *Stenopetalum incisifolium* (*sic*). No other record has, however, been elsewhere found of *C. australasica*. Salt Plagianth, *Plagianthus spicatus*, Benth. = *Sida Lawrenciana*, F. Muell., "in salt-marshes scattered along the coast . . . at the entrance of the Yarra" ("Pl. Indig.") Many-flowered Starwort, *Stellaria multiflora*, Hook., "rocky places near St. Kilda" (Hannaford, "Jottings"): Small Pearlwort, *Sagina apetala*, Linné, "in low meadows around Port Phillip" ("Pl. Indig."): Milky Beauty-heads, *Calocephalus lacteus*, Less., "among Juncaceæ at St. Kilda, &c." (Hannaford, "Jottings").

In the "Jottings" we read :—" A short walk through this noble forest of Eucalypti and Banksias (Honeysuckles, with bottle-brush-shaped flowers) and Casuarinæ (Sheoaks) brings us to St. Kilda"—presumably from Melbourne; and in describing his walk along the sea-shore there and " aside through a beautiful scrub of *Ricinocarpus sidæformis*" (*R. pinifolius*, Desf.), " a useful purgative," as he incidentally remarks—he mentions, among others, as occurring in the locality, " the graceful lilac *Diopogon leimonophilus*"—obviously a misprint for *Dichopogon leimonophilus*, Ferd. Mueller, given in the catalogue at the end of the book, and which, doubtless, is *D. strictus*, Baker (*Arthropodium strictum*, R. Brown); Dwarf Aphelia, *Aphelia pumilio*, *A. cyperoides* (a Western Australian species not occurring in Victoria—probably *A. gracilis* was meant), *Desvauxia tenuior*, R. Brown, Hairy Centrolepis, *Centrolepis strigosa*, R. and S., var. *tenuior*, Small-flowered Buttercup, *Ranunculus sessiliflorus* (*R. parviflorus* L., var. *sessiliflorus*, Slender Pennywort, *Hydrocotyle tripartita*, and Dwarf Bog-rush, *Chætospora axillaris* (*Schænus axillaris*, Hook., f.) *Brachycome angustifolia*, D. C., " marshy places near Brighton" (" Jottings"). This name could not be traced. It is not likely to be *B. angustifolia*, A. Cunn., and very probably is what we now know as *B. cardiocarpa*, F. v. M. *Lobelia alata*, R. Br., " in the lagoon near Liardet's, &c.," is also mentioned in the " Jottings," and is almost certainly *L. alata*, Labill. (*L. anceps*, Thunb.).

In the " Jottings" are also *Goodenia lanata*, R. Br., hab. " Brighton" — evidently the woolly var. *primulacea* of *G. geniculata*, R. Br., and *Tetrachæta perennis*, Ferd. Mueller, hab. " near St. Kilda," a composite, which is also not found elsewhere mentioned; *Daviesia corymbosa*, hab. " Hawthorn" ; *Pimelea curviflora*, R. Br., " hilly pastures near Hawthorn" ; and *Eurybia ciliata*, Benth. (*Olearia ciliata*, F. Mueller = *Aster huegelii*, F. Mueller), at Botanic Gardens, Melbourne.

Several other names might have been added with some reason—e.g., among others, *Comesperma defoliatum*, F. v. M., " scattered over sandy ridges from Port Phillip" (" Pl. Indig."), and *Zygophyllum Billardieri*, found " on coast rocks or drift sand from Port Phillip" (" Pl. Indig."); but they have been left out, as the locality is not sufficiently definite.

In the course of many visits to various parts of the district in the autumn and winter just past, it has been possible to verify many of Mr. Hart's records. These visits, mainly for the purpose of locating the vegetation still existing and of marking out the boundary of the formation, and, though not taken in the flowering-time of the majority of the plants, have yet enabled me to add to the list the considerable number of

species now to be mentioned. Most of these were noted in the eastern part of the formation, to the south of Oakleigh, Clayton, and Springvale. The presence here of a number of forms not occurring elsewhere in the district is no doubt due in part to contiguity with the neighbouring formation, the plants of which tend to invade the area under consideration, but mostly to the fact, evidenced by the presence of several springs, that the water content of the soil is probably greater than in the western part. At one of these springs, south of Oakleigh, just a little north of the old Dandenong track and east of Warragul road, the Woolly Tea-tree, *Leptospermum lanigerum*, was found, with the Straight-leaved Acacia, *Acacia stricta*, forming part of the thick scrub screening the water. The Clustered Bush-pea, *Pultenaea dentata*, was stretching its slender stem up amongst the less dense growth, and Brownbeards, *Calochilus Robertsoni*, still further out in the fringe. In the water, the Budding Club-rush, *Scirpus prolifer*, was got in association with Sphagnum.

On the occasion of one of my visits to this locality with Messrs. Barnard and Charles French, jun., the latter pointed out, very much to our surprise, the Batswing Fern, *Pteris incisa*, Ground Polypody, *Polypodium punctatum*, and small plants of the Prickly Tree-fern, *Alsophila australis*, and Common Tree-fern, *Dicksonia Billardieri*, which his keen eye for natural objects had noticed in an obscure water-channel on a previous visit.

In thick scrub, somewhat away from the water, the Coral Fern, *Gleichenia circinata*, was again noted. Great masses of this charming plant were upheld to a height of 6 or 8 feet, and its freshness and luxuriance were pleasant to see so close to town. Still further interest was lent to the vicinity when Mr. St. John, after some diligent searching, succeeded in re-discovering a couple of almost unnoticeable plants of the Holly Grevillea, *G. ilicifolia*, on the high ground to the south-east of the spring, and the Small-flowered Boronia, *Boronia parviflora*, just east of the boiling-down works in the lane to the west leading to Centre-road. The Cut-leaved Xanthosia, *Xanthosia dissecta*, is to be seen in thick tufts on the Metropolitan golf links.

Another locality, near the junction of Heatherton and Clayton roads, also marked by a spring—or, rather, two springs close together—was fertile in plants not previously noted. Here the Golden Bush-pea, *Pultenaea Gunnii*, Clustered Bush-pea, *P. dentata*, Slender Flowering-rush, *Xyris gracilis*, and Creeping Club-moss, *Lycopodium laterale*, were not uncommon, and the damp surrounding area furnished frequent tussocks of the Coast Bog-rush, *Lepidospora tenuissima*, the Angular Twig-rush, *Gahnia tetragona*, F. v. M. (*Cladium tetragonum*,

Hook. f.), Spreading Rope-rush, *Calostrophus lateriflorus*, Narrow Sword-sedge, *Lepidosperma lineare*, and Thread Sword-sedge, *L. filiforme*. In the vicinity also were the Tasman Scale-rush, *Lepyrodia Tasmanica*, and such cyperaceous plants as the Black Saw-sedge, *Gahnia radula*, Giant Saw-sedge, *G. psittacorum*, Giant Sword-sedge, *Lepidosperma exaltatum*, Hill Sword-sedge, *L. concavum*, and the Common Love-grass, *Eragrostis Brownii*. South-west from Clayton, in the water reserve, but restrained within bounds and cleared of surrounding scrub, is yet another spring, which has seemingly been used as a source of water supply for many years. What Mr. St. John considers to be the Rosemary Everlasting, *Helichrysum rosmarinifolium*, and hitherto regarded as a sub-alpine species from the North-East, was found near by.

On damp ground here, and also near Mordialloc—probably, too, in many other places—the little Crucifer, the Hairy Bitter-cress, *Cardamine hirsuta*, is growing plentifully. The Pale Mat-rush, *Xeroles glauca*, and Narrow-leaved Bitter-pea, *Daviesia corymbosa*, occur close to Clayton. The latter was seen only very occasionally elsewhere, whereas *D. latifolia* is quite copious at Springvale, and not infrequently in other places. The curious minute Side-flowered Bladderwort, *Utricularia lateriflora*, was flowering in May in the drain along Heatherton-road, and at the junction of this and what is locally known as the Turtle-road, the Drooping Cotton-wood, or Chinese Scrub, *Cassinia arcuata*, was in abundance on broken ground. This plant is probably a recent comer here, and will surely not waste any time in extending its habitat.

Of the Spreading Acacia, *Acacia diffusa*, a few belated bushes are near the Murrambeena station, and no doubt owe their continued existence to the formidable nature of their defensive phyllodes. The Caltrops, *Tribulus terrestris*, and the Small Pigface *Mesembryanthemum legens*, once so prevalent on the flats behind the barracks on the St. Kilda-road, were recognized on the occasion of a recent Club excursion to Coode Island.

In the lane leading west from Clayton-road are some gums quite foreign to the western part of the formation. These are the Messmate, *Eucalyptus obliqua*, Red Stringybark, *E. macrorhyncha*, and the Apple Gum, *E. Stuartiana*, and have obviously intruded from the eastward.

ADDITIONS TO THE CENSUS OF THE "SANDRINGHAM" FLORA.

h indicates plants found on the foreshore; *t*, those of the "leptospermum"; *s*, of the scrub-land; *a*, aquatic plants and those in wet ground; ***, plants rarely met with.

RANUNCULACEAE—

* *Ranunculus parviflorus*, L. var. *sessiliflorus*—Small-flowered Buttercup.

CRUCIFERA.—

* *Capsella elliptica*, C. A. Meyer (*C. procumbens*, Fries)—Oval Shepherd's

a *Cardamine hirsuta*, Linne—Hairy Bitter-cress.

[Purse,

ZYGOPHYLLACEÆ—

Tribulus terrestris, L'Obel—Caltrops.

MALVACEÆ—

h *Plagianthus spicatus*, Benth.—Salt Plagianth.

CARYOPHYLLACEÆ—

Stellaria multiflora, Hook.—Many-flowered Starwort.

Sagina apetala, L. (*S. procumbens*, L.)—Small Pearlwort.

FICOIDEÆ—

h *Mesembryanthemum tegens*, F. v. M.—Small Pigface.

POLYGONACEÆ—

a *Rumex bidens*, R. Br.—Mud Dock.

LEGUMINOSÆ—

s *Daviesia latifolia*, R. Br.—Broad-leaved Bitter-pea.

s " *corymbosa*, R. Br.—Narrow-leaved Bitter-pea.

s *Pultenaea Gunnii*, Benth.—Golden Bush-pea.

s *Glycine clandestina*, Wendl.—Delicate Glycine.

s *Acacia stricta*, Willd.—Straight-leaved Acacia.

* *s* " *diffusa*, Edw.—Spreading Acacia.

MYRTACEÆ—

* *a* *Leptospermum lanigerum*, Sm.—Woolly Tea-tree.

s *Eucalyptus rostrata*, Schlecht.—River Red Gum.

s " *obliqua*, L'Heritier—Messmate.

s " *macrorrhyncha*, F. v. M.—Red Stringybark.

s " *Stuartiana*, F. v. M.—Apple Gum.

UMBELLIFERÆ—

s *Hydrocotyle tripartita*, R. Br.—Slender Pennywort.

s *Xanthosia dissecta*, S. Hook.—Cut-leaved Xanthosia.

s *Eryngium rostratum*, Cav.—Blue Eryngo.

PROTEACEÆ—

* *s* *Grevillea ilicifolia*, R. Br.—Holly Grevillea.

THYMELIACEÆ—

* *s* *Pimelea curviflora*, R. Br.—Curved Rice-flower.

RUBIACEÆ—

l *Galium umbrosum*, Sol.—Tufted Bedstraw.

COMPOSITÆ—

* *s* *Aster hugelii*, F. v. M. (*Olearia ciliata*, F. v. M.)—Blue Aster.

* " *stellulatus*, Lab. (*Olearia stellulata*, D. C.)—Snowbush Aster.

* *s* *Heptipetalum corymbiflorum*, Schlecht.—White Sunray.

* *s* *Calocephalus lacteus*, Less.—Milky Beauty-heads.

s *Cassinia arcuata*, R. Br.—Drooping Cotton-wood or Chinese Scrub.

s *Helichrysum rosmarinifolium*, Less.—Rosemary Everlasting.

CAMPANULACEÆ—

Lobelia microsperma { (*L. gibbosa*, Lab.)—Blue Lobelia.
" *simplicicaulis* }

GOODENIACEÆ—

* *s* *Velleya paradoxa*, R. Br. (*Velleia paradoxa*, R. Br.)

SCROPHULARINEÆ—

Veronica peregrina, L.—Wandering Speedwell.

ORCHIDÆ—

* *s* *Thelymitra Macmillani*, F. v. M.—Red Hood-orchid.

s *Diuris palustris*, Lindl.—Swamp Diuris.

s " *punctata*, Sm.—Purple Diuris.

s *Calochilus Robertsoni*, Benth.—Brownbeards.

s " *campestris*, R. Br.—Satyr Orchid.

* *s* *Prasophyllum Frenchii*, F. v. M.—Stout Leek-orchid.

* *s* " *Dixonii*, F. v. M.—Dixon Leek-orchid.

s *Lyperanthus Burnettii*, F. v. M. (*Burnettia cuneata*, Lindl.)—Wedge-leaved Burnettia.

s *Caladenia congesta*, R. Br.—Slender Caladenia.

s *Chiloglottis diphylla*, R. Br.—Twin-leaved Bird-orchid.

LILIACEÆ—

- s* *Dianella longifolia*, R. Br. (*D. laevis*, R. Br.)—Long-leaved Flax-lily.
** s Thysanotus tuberosus*, R. Br.—Bulbous Fringe-lily.
s Xerotes glauca, R. Br.—Pale Mat-rush.

TYPHACEÆ—

- a* *Typha angustifolia*, L.—Bulrush.

RESTIACEÆ—

- s* *Lepyrodia Tasmanica*, J. Hook.—Tasman Scale-rush.
Aphelia pumilio, F. v. M.—Dwarf Aphelia.

CYPERACEÆ—

- a* *Eleocharis sphacelata*, R. Br.—Tall Spike-rush.
a " *acuta*, R. Br.—Common Spike-rush.
a *Scirpus inundatus*, Spreng.—Swamp Club-rush.
a " *prolifer*, Rottb.—Budding Club-rush.
a *Schizenuis axillaris*, Poiret—Dwarf Bog-rush.
s *Lepidospora tenuissima*, F. v. M.—Coast Bog-rush.
s *Lepidosperma exaltatum*, R. Br.—Giant Sword-sedge.
s " *concavum*, R. Br.—Hill Sword-sedge.
s " *lineare*, R. Br.—Narrow Sword-sedge.
s " *filiforme*, Lab.—Thread Sword-sedge.
s *Cladium radula*, R. Br. (*Gahnia radula*, R. Br.)—Black Saw-sedge.
s " *psittacorum*, F. v. M. (*Gahnia psittacorum*, Lab.)—Giant Saw-sedge.
s " *tetraquetrum*, J. Hooker—Angular Twig-rush.

GRAMINEÆ—

- Zoysia pungens*, Willd.—Prickly Couch grass.
s Eragrostis Brownii, Nees.—Common Love-grass.

LYCOPODINEÆ—

- s Lycopodium laterale*, R. Br.—Creeping Club-moss.
s Selaginella Preissiana, Spreng.—Preiss Club-moss.

FILICES—

- s Alsophila australis*, R. Br.—Prickly Tree-fern.
s Dicksonia Billardieri, F. v. M. (*D. antarctica*, Lab.)—Common Tree-fern.
a Pteris incisa, Thunb.—Batswing Fern.
s Polypodium punctatum, Thunb.—Ground Polypody.

These 73 additions to the census raise the total number of species (phanerogams and pteridophytes only) to 460. Those strictly Australasian number 316—68.5 %; those ranging also outside 144—nearly 31.5 %, and occurring also in New Zealand 120—over 26 %. 403 species are common to four or a greater number of States—88 %, leaving only 54 with a more restricted distribution, and of these only 5, or just over 1 %, are endemic to Victoria. The latter include *Mesembryanthemum tegens*, *Prasophyllum Frenchii* and *P. Dixonii*. The tally of terrestrial orchids is now 66 (if *Pterostylis præcox* is considered a variety of *P. reflexa*) out of a total of 88 for the State—75 %; and *Gastrodia* and *Drakæa* are the only genera unrepresented.

It is interesting to note that 11 species among 37 mentioned by Dr. Cockayne as being characteristic of the northern heath of New Zealand also occur in the Sandringham district. In the census *Spergularia rubra*, Presl., should be *S. rubra*, Cambess., and Sea Lime-grass should read Sea Lyme-grass.

As confirming the opinion already expressed that the Sandringham formation probably extended to Hawthorn and

Camberwell, Mr. Topp writes:—“ . . . about 15 years ago a large number of the most numerous individuals of the species of the Sandringham scrub were to be found in paddocks on the Burke-road, Camberwell, e.g.:—*Styphelia*, *Correas*, *Hibbertias*, *Asters*, *Pultenæas*, *Droseras*, *Leptospermum scoparium*, *L. myrsinoides*, &c. Recent investigation, however, proves that it goes much further, though exact definition of its original limits is possible only from Springvale southward. Here the scrub-land, containing all the species most characteristic of it, ends in places quite abruptly on the lightly-timbered Red Gum flats near Dandenong. In other places the transition is not so well marked, the scrub gradually thinning out, some of its plants and the gums common to it mingling with those of the adjacent formation. Northward from Springvale the boundary is so ill-defined that it is possible to mark it out only from the evidence of occasional patches of scrub, by the presence here and there of characteristic plants, but mostly the appearance of soil alone has to be depended on.”

Near Mordialloc the scrub is separated from the creek by flats, once swamps, and originally covered in great parts by a dense growth of the Swamp Paper-bark, *Mcalleuca cricifolia*; further from the town the Red Gum flats intervene. From the vicinity of the Dandenong Creek the boundary runs in a north-easterly direction to within a mile or so of Dandenong, on the road to that place from Mentone. It goes still a little further east from here, and then turns north-west past the Springvale station, crossing the line a little west of it. Judging mainly from the nature of the soil, it continues in the same direction a little west of Notting Hill to Scotchman's Creek. A small area of the formation exists in the vicinity of Clayton station, considerable tracts of it between Clayton-road and Oakleigh, and *Leptospermum* and bracken in the town itself. Just opposite to Oakleigh, on the high ground between the creek and Waverley-road, is an area containing bracken, *Ricinocarpus*, *Correa*, *Leptospermum myrsinoides*, &c. From here the line follows the course of Scotchman's Creek, and about midway between Waverley-road and High-street turns again north-west, passing well to the east of Burwood and a little east of Canterbury station.

A fairly large area south of Riversdale and east of Boundary-road, wooded with *Eucalyptus viminalis*, and containing now only bracken, *Aotus*, *Leptospermum scoparium*, *Bossiaea prostrata*, and *Styphelia humifusa*, helps to mark the line. In this locality the formation may be said to come in touch with that of the Ringwood district.

From Canterbury, after going a little north, the line passes in a westerly direction through Kew, and ends in the vicinity of

the Asylum. Regarding this part of the northern boundary of the area, it may be mentioned that Mr. F. G. A. Barnard, in his recently published "History of Kew," speaking of the south-eastern portion of the borough, says :—" on some of this land the native heath used to flourish, along with many another wild-flower, but all have long since vanished." He tells me that the spot more particularly referred to was a paddock at the corner of Barker's-road and Wrixon-street (the continuation of Auburn-road); that the same kinds of vegetation used to occur a little further east, on the Hawthorn side of Barker's-road, and extended through to Harcourt-street. In Burke-road south, just below Anderson-street, was a small paddock, now occupied by a violet farm, in which *Pterostylis reflexa* could be found. The best collecting-ground that he remembers was known as Snowdon's paddock, in Canterbury-road, Camberwell, now the site of Hopetoun-avenue and numerous villas, where as late as 1887 the singular brown orchid, *Culadenia suaveolens*, *Thelymitras*, tea-tree, &c., still existed.

Although bounds have been set to the formation, this does not mean that in places it did not perhaps exceed them, or that it occupied the whole of the area included by them. The valleys of Gardiner's Creek and its branches were only in part covered by it. It was most likely not existent over by far the greater extent of Hawthorn, nor was it present on the highest parts of the south bank of the Yarra, where the bedrock comes to the surface. Again, only a comparatively small portion of the area now bounded by Fitzroy-street, St. Kilda-road, and the Yarra was ever covered by it. Here most of the land was originally only a few feet above sea-level, and now, apart from Emerald Hill, very little of it has an elevation of more than 10 feet or a little more. Out of this "the Hill" stood up like an island, with lagoons and many swamps surrounding it, and precisely what vegetation originally covered it is difficult to say. Although recourse has been had to early publications likely to throw any light on its original appearance, and to old inhabitants, very little exact information has been gained. Hoddle's plan has on its site "grassy hills, forest land." Mr. Pritchard tells us in his "Geology of Melbourne" that its composition is similar to that of Batman's and Hotham Hills, across the river, and made up of the Older Basalt, capped by sands and gravels of the Miocene or Kalimna age. He has, no doubt, authority for more definitely stating that eucalypts, sheoaks, wattles, and many other plants existed there. If it had carried the characteristic "Sandringham formation," which is never at any time "emerald," it had hardly have earned the name it once bore, and we must conclude that its forest was very open, composed of the trees mentioned by Mr. Pritchard, and grassed as Hoddle describes it.

With regard to the surroundings of "the Hill," I am able to say from personal recollection that the Coast Tea-tree existed at the back of the targets on the rifle-butts, and elsewhere, vestiges of it remaining until quite lately behind the fishermen's huts at Port Melbourne. It is probable it was discontinuous all along the bay front. My own school-boy rambles enable me to say also that there were shifting sand-dunes, almost devoid of any plant life, extending for some hundreds of yards back from the water at one point at least. This was just south of the battery, about and beyond the corrugated iron building which housed the nearly-time-expired prisoners then at work on the military road. The Butts, where now is Middle Park, I can distinctly remember as being very swampy in parts and only sparsely covered with lowly plants. Concerning the locality beyond the Sandridge Lagoon, where landing was effected by the earliest comers to Melbourne, the following excerpt from the manuscript of Josephine Antoinette Macdonald, of Wellington, N.Z., is of some interest. This I am permitted to include here by the courtesy of Mr. Greig, hon. secretary of the Historical Society of Victoria, the possessor of the document. Mrs. Macdonald was a daughter of the late Wilbraham Frederich Evelyn Liardet, after whom the beach at Port Melbourne was first named, and arrived in the colony with her father in 1838, when about 8 years of age. This lady writes:—" Liardet's Beach was at this time a beautiful, clean, white sandy beach, covered thickly with a great variety of lovely both small and large shells, and quite close down to where the tide came up there was a skirting of what we called the tea-tree. Above that again, all along the beach, grew the wild cactus" (surely the Angled Pigface) "that produced a rich-looking flower of a dark mauve, with a yellow centre, and an insipid kind of fruit, full of small seeds, about the size of a large gooseberry; there were thousands of other pretty wild-flowers of all colours right on as far as we could walk, up to a lagoon which I think had become filled up before I left Victoria. It was just on this spot where the only thing to show that man had ever trod before met our surprised young eyes; it was a post with a small cask nailed to it, and which we were told was placed there by Mr. Batman. Beyond all these lovely flowers was the forest and the silver wattle, which we in New Zealand prize very much; then the he-oak and the she-oak—both trees apart from each other look the same, but when you see them growing together you see that instead of leaves they have needles like pine trees, and the needles of one tree droop down, while the needles of the other stand up; then the wild cherry, which is another peculiar tree, for the stone grows outside at the end of the cherry instead of inside the fruit. There were also lots of blue gums, or eucalypts,

from which my little brothers and sisters used to gather the manna which fell down from them." The oaks referred to here were obviously the Drooping Sheoak, *Casuarina quadrivalvis*, and the Black Sheoak, *C. suberosa*, and the gum the Manna Gum, *Eucalyptus viminalis*.

The "Plan of North and South Melbourne," surveyed by Robert Hoddle in 1842, also furnishes some information regarding the vegetation of the area. This most interesting document I was privileged to inspect by the kindness of Mr. Saxton, of the Lands Department. On it the south bank of the Yarra right up to the site of Prince's Bridge is shown to be bordered with a dense growth of the Swamp Paper-bark. The belt was of varying thickness, and widest in the swampy bend of the river then or after known as Fisherman's Bend—now Coode Island. Nearly opposite Spencer-street, and outside the Paper-bark, occurred "scrub and trees," and a large area between this and what is now City-road is marked "poor, sandy forest land." The flats between "the Hill" and the river and St. Kilda-road are generally described as "marshy plain, occasionally covered with water." Clumps of tea-tree (Paper-bark) are represented as existing about the swampy land along what is now St. Kilda-road. Albert Park Lake was not then one piece of water, but seemingly several swampy water-holes with a bordering of the same Paper-bark.

To the west of Bay-street, Sandridge (the part described by Mrs. Macdonald), the foreshore is marked as "barren heath, bare of trees," and "honeysuckle." Between the "saltwater shallow lagoon," which curtailed the rambles of Liardet's children—the mouth of which now exists as a boat harbour—and the "dray track to Melbourne," corresponding to the present Fitzroy-street, the foreshore is marked in places "rushes," with again "barren heath, bare of trees." Swamps are represented back of this, and between these swamps and the others now constituting the Albert Park Lake, the interval is set down "sandy forest land, the timber indifferent, consisting of *Eucalypti*, *Casuarina*, *Mimosa*." There is thus sufficient evidence to show that "the heath" extended in a narrow strip almost to the mouth of the Yarra, but the remainder of the area, being wet and saline ground, subject to floods, must certainly have carried mainly plants characteristic of such situations, such as salt-bushes and other salt-loving plants, with the trees mentioned, and perhaps outlying small patches of the heath.

As can be seen by reference to the map, vestiges of the original vegetation still exist comparatively close to the city—notably, near the Brighton Cemetery, along the Rosstown railway, and near Ashburton, in the angle between the outer circle railway and Gardiner's Creek. Here may still be seen, in association with a

grove of *Eucalyptus viminalis*, bracken, *Correa speciosa*, *Leptospermum laevigatum*, *L. scoparium*, *Bossiaea cinerea*, *Bursaria*, *Tetratheca*, *Styphelia virgata*, and others. There are groves of the same eucalypt on the other side of the creek in Malvern, but all the under-scrub except the bracken has long since disappeared.

Sandringham, so long a favourite locality for our Club excursions, will soon be completely denuded of its heath grounds. The only large block now remaining, that north of Bay-road, is at the present moment being cut up for building sites. The belt of *Leptospermum* along the cliff edge as far as Black Rock is already spoilt by the crowds of picnickers which frequent it in holiday time, and after this year the name of Sandringham must necessarily cease to appear on our programmes.

Black Rock is also becoming covered with habitations, and the Ebden estate, which it was once hoped might be reserved for the preservation of the native flora, will at an early date be thickly populated. At the present time the largest unspoilt areas available for purposes of botanical study exist between Black Rock, Beaumaris, and Cheltenham, and from there on towards Oakleigh, and south from Clayton and Springvale. Even these must disappear in the near future, for, apart from their desirability as sites for habitations, the soil is eminently suited for market-gardens.

Just here is perhaps an appropriate place, in view of the inevitable extinction of the flora elsewhere, to express the hope that the two proprietary golf clubs—the Royal Melbourne at Sandringham, and the Metropolitan at Oakleigh—may elect, if they have not already done so, to most scrupulously conserve on their links wherever possible the vegetation already existing. It may even be urged that they plant also only such species native to the formation as do not happen to occur there now, so that the old original flora of the district may be represented as completely as possible. By so doing they would stamp the links with a character not possessed by others and establish natural botanical gardens which could not fail to be attractive to their own members, and which would be of absorbing interest to those botanists who might be privileged to visit them in future years.

As the eastern limits of the formation are approached it will be noticed that plants which may be described as naturalized aliens from the neighbouring formations begin to appear. The Daviesias, *Pultenaea Gunnii*, *Acacia diffusa*, *Leptospermum lanigerum*, *Cassinia arcuata*, the gums now added to the list, and the ferns found at the spring south of Oakleigh are certainly not characteristic of the district. The complex low growth met with near the sea, where as many as 25 species can often be reached from one standpoint, is still present on the higher and

drier ground, but on lower levels, where the water content of the soil is greater, plants such as *Viminaria denudata*, the Melaleucas, *Sprengelia*, *Epacris obtusifolia*, *Lycopodium laterale*, *Selaginella*, *Xyris*, Cyperaceous and Juncaceous plants, appear to a much greater degree than in the west. Groves of *Eucalyptus viminalis* are much more often met with, and definite associations are more obvious. The most striking of these are made up of *Eucalyptus viminalis*, bracken, and a limited number of the plants most characteristic of the formation, growing in a more open fashion; or the gum associated only with bracken and *Ricinocarpus*, or bracken and *Leptospermum scoparium*.

A very definite association exists just off the Heatherton-road, composed of four strata, or stories, *Melaleuca squarrosa* being dominant and constituting the facies (the primary, superior layer, first distinguished), *Epacris obtusifolia* coming next in importance and height, but only recognized when at closer quarters, followed by bracken, with the floor occupied by *Selaginella*. Among this select company are occasional plants of *Sprengelia*, *Leptospermum scoparium*, *Acacia oxycedrus*, and *Hibbertia fasciculata*. Near this association is an example of invasion by the neighbouring vegetation of a piece of cleared and once cultivated ground. The plant association at present existing is still very open, and it would be most interesting to watch its future progress. Other groupings, though less striking, may be seen near the spring reserve at Clayton, where *Leptospermum myrsinoides* preponderates, *Ricinocarpus pinifolius* is secondary, and occasional plants of *Acacia oxycedrus* and *Casuarina distyla* catch the eye. Presently, at a lower elevation, *Melaleuca squarrosa* is dominant, *Lepidosperma longititudinale* and *Sprengelia* coming next in frequency, and *Acacia verticillata* and *Persoonia juniperina* occasionally. Near the Cheltenham water reserve *Leptospermum myrsinoides* again prevails in one place, with a plentiful admixture of *Styphelia virgata* and *Epacris impressa*, the subordinate plants being stunted Banksias, *Ricinocarpus*, Asters, &c. Earlier or later in the season the "aspect" varies, more particularly with regard to the secondary plants of the associations. Damp, flat places which seem to be monopolized by *L. pilosperma* at one time, are later seen to be associated with *Limnanthemum* and *Brachyscome cardicarpa* or *Craspedia*, &c. Generally speaking, growth in this damper locality is taller than nearer the sea, *Ricinocarpus*, for example, attaining a height of about 10 feet on the Turtle-road. Towards the eastern boundary better opportunities are afforded for studying what Clements terms "ecotones" or tension lines between adjoining formations, associations, and zones of plants. These are the lines where competition is going on not only between individuals, but also

between associations of plants; where, as physical conditions alter, where the factors determining the growth of vegetation vary, now one side, now the other, gains advantage and extends its range at the expense of its neighbour.

According to Clements, the plant association (formation, &c.) is to be regarded as a more or less complex organism, the result of certain factors present within the given area, the principal of these being the water content of the soil, humidity, light and temperature—and all capable of measurement. Shortly, the formation is the expression of a habitat, which term is exactly equivalent to environment. It possesses functions and structure, and passes through a cycle of development similar to that of a plant. As the simplest illustration, take an area hitherto unoccupied by plant life (*open*). An individual plant arises in this area, its seed having migrated from a distance—the plant thus must have *mobility*. This plant establishes itself and reproduces itself (*ecesis*). Migration and ecesis constitute *invasion*. An aggregation of individuals occurs, yielding the simplest *association*—a *group* in vegetation, the *family*; further grouping of these results in a *community*. Especially when more than one species is taking possession of the ground, variety is given to the association, zones and layers, &c., are formed, giving it *structure*. According to the seasons it presents different appearances or *aspects*. For the areas controlled by principal species, but changing from aspect to aspect, Clements proposes the term *society*. The primary divisions of a formation he would call *consociations* or *consocies*, and would apply the term to an area characterized by a *facies* (dominant species of the formation). When the whole of a natural area is covered with vegetation the formation is said to be a *closed* one, and its stability is greater than ever before. But there is no stasis. Change is always going on, competition still keen, and as the factors vary other plants better suited to the changed conditions invade the formation, and *succession* occurs. The final result is generally the forest after a series of these successions.

To those establishing collections of dried plants, some of the suggestions of Clements in favour of formational herbaria may be of interest. Instead of the usual grouping in genera and families, he would have the plants arranged with regard to their position in the formation. This certainly seems most rational, and, as he says, permits of definite comparison between vegetations occurring in different localities. Specimens should, of course, show both flower and fruit, with the under-ground parts present and as perfect as possible. The grouping of the specimens should have respect to their time of appearance, their abundance, their importance as constituting the "facies," and definite associations in the formation should also

be taken into account. With the plants should be data concerning migrational contrivances, seed production, pollination and period of flowering, in addition to the name, date, and place of collection, the vegetation form of the plant, &c., and, if possible, photographs giving a general view of the formation, its physiographic setting, nearer views of its seasonal aspects, detail views of its structure (associations, zones, layers, &c.), and flower portraits of the constituent species.

Briefly referring to a few of the more characteristic and more interesting of the plants of the district, the Coast Tea-tree is found to occur more frequently and widely than was at first thought. To the south it is, no doubt on account of its being less restricted, much more abundant, and the belt along the sea front much wider. It is seen often almost at the extreme edge of the formation about Springvale, on both sides of High-street, near Ashburton, and the existence of hedges to the north of Burwood leads one to suppose it originally grew there naturally. The Swamp Paper-bark, *Melaleuca ericifolia*, naturally bounded the formation north and south, and was the principal plant of the creek valley. A lover of wet ground, it is not seen until the region of the springs and swamps is come to in the eastern part of our area. When conditions are favourable it is, like the Coast Tea-tree, a *socially exclusive* plant, forming dense closed associations with only a few climbers and wet-ground plants existing for a little distance among its close-set stems.

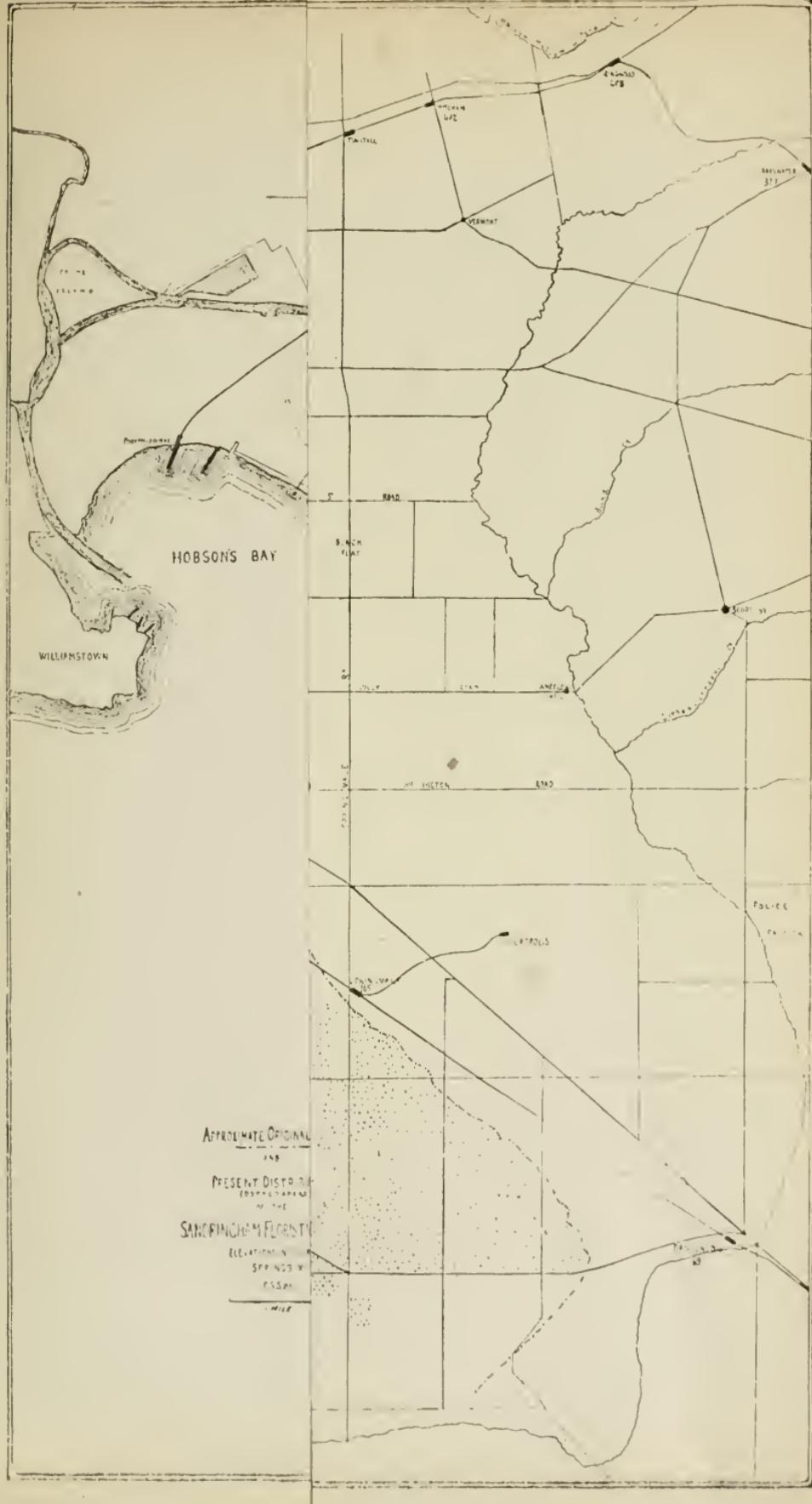
Concerning the plants found in the area but not characteristic of the formation, the great majority are explicable by their occurrence in adjoining formations. With regard to *Oxylobium ellipticum*, Mr. Charles French has shown that it is an escapee. The case is more difficult with *Grevillea ilicifolia* and *Lasiopetalum Baueri*, seemingly far removed from their natural habitats, and for them an explanation is not ventured at present.

As to the map which accompanies these notes, I would not have it supposed that it indicates *all* the patches of formation at present existing, or even indicates them exactly. I think, however, it may be taken to show all the larger areas. For that it is by no means perfect, my excuse must be that time and opportunity have not permitted me to traverse every road in the district, and that the assistance I had hoped to get from a quarter most likely to furnish more exact data was unfortunately unobtainable. I hope, however, it may be helpful, and enable members to visit localities which without its aid might remain unknown to them.

The meteorological records so kindly given by Mr. P. Baracchi, Government Astronomer, will help to explain the vegetation generally covering the district, and also the difference between that occupying its eastern portion and that nearer to the sea.

MEAN TEMPERATURES, AVERAGE NUMBER OF WET DAYS, AVERAGE RAINFALL.

Month.	Melbourne, 56 Years.	Camberwell. 11 Years	Brighton. 19 Years,	Caulfield. 20 Years,	Murrumbeena. 22 Years,				Mordialloc 6 Years,	Averages in first three Stations				Averages all Stations.									
					Inches.	Days.	Temp.	Inches.	Days.	Temp.	Inches.	Days.	Temp.										
January ..	1.87	7	66.2	2.99	8	68.1	1.94	8	66.3	1.22	5	65.6	1.38	5	1.55	7	1.96	4	1.63	6	66.7	1.63	5.6
February	1.75	6	66.3	1.94	7	68.3	1.22	5	65.6	2.24	8	61.8	2.55	9	2.48	11	3.21	6	2.43	8.6	62.8	2.59	8
March ..	2.21	8	63.5	2.86	10	63.3	2.23	11	57.9	2.23	12	59.1	2.98	10	3.17	12	1.91	8	2.47	10.6	58.5	2.58	10.5
April ...	2.31	10	58.5	2.87	12	53.4	2.48	13	53.2	2.35	13	53.2	2.71	13	2.78	15	2.66	11	2.33	12.6	53.2	2.52	12.8
May ...	2.16	12	53.4	2.48	16	49.6	2.48	16	49.6	2.37	17	49	2.46	13	2.68	15	2.41	11	2.32	15.3	49.4	2.42	14.1
June ...	2.12	13	49.6	2.48	17	47.6	2.48	17	47.6	2.37	18	47.6	2.46	13	2.68	15	2.41	11	2.32	15.3	49.4	2.42	14.1
July ...	1.85	14	47.6	1.78	15	48.1	2.16	15	47.1	2.39	13	2.56	17	2.29	10	1.93	14.6	47.6	2.17	14	47.6	2.17	14
August ...	1.81	13	50.3	2.35	15	49.4	2.46	16	48.7	2.05	13	2.28	17	2.09	11	2.20	14.6	49.4	2.17	14	49.4	2.17	14
Sept. ...	2.34	13	52.9	2.36	14	53.2	2.30	13	51.9	2.38	13	2.60	16	2.27	11	2.33	13.3	52.6	2.37	13.3	52.6	2.37	13.3
October ..	2.65	13	56.4	2.17	13	57.4	2.30	13	55.9	2.48	10	2.74	14	2.21	10	2.37	13.3	56.5	2.42	12.1	56.5	2.42	12.1
November	2.20	10	60.5	1.55	9	62.0	1.81	9	60.8	2.03	9	2.37	11	1.95	5	1.85	9.3	61.1	1.98	8.8	61.1	1.98	8.8
December	2.27	9	63.4	2.12	8	66.2	1.90	8	63.2	2.13	8	2.61	10	2.23	6	2.09	8.3	64.2	2.21	8.1	64.2	2.21	8.1
Totals and Averages	25.54	12.8	57.4	27.96	140	58.2	25.28	136	56.8	27.75	124	30.36	156	26.90	97	26.26	134	57.4	27.29	130	57.4	27.29	130





The Victorian Naturalist.

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NOVEMBER 7, 1912.

No. 347.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th October, 1912.

The president, Mr. J. A. Leach, M.Sc., occupied the chair, and about 65 members and visitors were present.

REPORTS.

A report of the excursion to Ringwood on Saturday, 14th September, was given by the leader, Mr. J. A. Leach, M.Sc., who said that the afternoon turned out wet, and the party was unable to ramble far from the railway station. However, a preliminary inspection of the locality was made in the morning, when about 25 species of birds were seen. Towards the close of the afternoon refreshments were provided by Mr. D. and Miss Davis.

In the absence of Dr. C. S. Sutton, leader of the excursion from Clayton to Oakleigh, on Saturday, 28th September, Mr. P. R. H. St. John stated that the party noted over 100 species of plants in flower and nearly a dozen birds.

Mr. J. G. O'Donoghue, leader of the excursion announced for Brisbane Ranges on Saturday, 12th October, reported that the excursion lapsed, as only one member besides himself attended. They, however, spent a pleasant day by making the shorter trip to Werribee Gorge.

The junior excursion to Sandringham on Saturday, 5th October, was, in the absence of the leader, Dr. C. S. Sutton, briefly reported by Mr. C. Stout, who said that about 27 juniors and friends attended. Wild-flowers were numerous, and some very interesting collections were made.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. George Baird, "Purleigh," Garvoc, was duly elected a country member of the Club.

PAPERS READ.

1. By Mr. Reginald Kelly, entitled "Concerning Acacia Phyllodes."

The author, in an interesting paper, called attention to the difference in the so-called phyllodes of the acacias, and questioned whether phylode was really the correct term to be used with regard to several species. He advanced the opinion that all plants respond to stimuli, hence their schemes and devices for self-preservation and multiplication.

Mr. F. Pitcher thanked the author for opening our minds to fresh thoughts in connection with the acacias, and suggested that the committee should arrange for a further discussion of the subject at some future meeting after members have had an opportunity of perusing the paper in print.

Mr. A. D. Hardy, F.L.S., endorsed the remarks of Mr. Pitcher, as he thought that members were hardly prepared to discuss such a paper at a few minutes' notice.

Mr. F. G. A. Barnard said that he had examined leaves and phyllodes of acacias from time to time, and the different technical terms that had been applied to them seemed to amount to word-splitting.

Dr. C. S. Sutton said that the subject was a fascinating one, and afforded great scope to the imagination.

The president remarked that the author had opened up another large field for research, and hoped that members would embrace the opportunity and study these plants as living things.

2. By Prof. W. Baldwin Spencer, C.M.G., M.A., F.R.S., entitled "A New Species of Kangaroo."

In the absence of the author, who is still engaged on official work in the Northern Territory, this paper was read by Mr. J. A. Kershaw, F.E.S. The author described as a new species a kangaroo which occurs among rocky ranges on the East Alligator River, Northern Territory. The animal is said to be an active climber, and, according to the natives, inhabits caves and rock shelters, out of which it is driven by the smoke of fires when the country is being burnt off. Being stupefied by the smoke, the kangaroo, so the natives say, comes out of the caves "rubbing its eyes," and can then be speared. The animal is considered rare, and apparently has a limited range.

The president said it was interesting to add another mammal to the list of Australian animals.

Mr. G. A. Keartland thought that there were other new species in the North-West, and hoped that the author would have the opportunity of recording further additions to our fauna.

Mr. A. D. Hardy said it was gratifying to know that the Club had not been forgotten by the author of the paper, though so far away, and asked what was the difference between a wallaby and a kangaroo.

Mr. J. A. Kershaw explained that the difference was only an artificial one—viz., measurement.

NATURAL HISTORY NOTES.

Mr. F. P. Spry said that recently, while collecting ants in the vicinity of Port Melbourne, he had found under a stone a colony of a small black ant belonging to the genus *Iridomyrmex*.

In one of the galleries that led to the surface a small number of aphides were clustered together, attended by ants, which, when disturbed, attempted to carry them away. The distance from their position in the nest to their food was about twelve inches, and it seemed to him to be an impossible feat for them to cover this distance without the assistance of the ants. The relation between aphides and ants is well known, and has been recorded many times; but he did not think their presence in the nest had been recorded for Victoria previous to the reference in Mr. Goudie's paper in the September *Naturalist* (p. 73).

EXHIBITS.

By Mr. P. R. H. St. John.—Specimens of *Eriostemon myoporoides*, from Mount Donna Buang.

By Mr. F. Pitcher.—Fasciated stem developed in a young Casuarina from Casterton, forwarded by Mrs. Z. Y. Neall, with photograph of same.

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD-FLOWERS.

IN accordance with the custom of late years, the exhibits at the October meeting of the Club consisted principally of wild-flowers, but the display was not equal to many of the previous ones, for several reasons. Firstly, the date, 14th October, was too late on which to get good specimens of many of our most interesting flowers: secondly, the dry winter had apparently affected the quantity available; and thirdly, the day previous turning out wet prevented so much collecting being done as had been planned by several members. Few exhibits were received from country friends, so that the flowers were almost entirely representative of the flora within a 50-mile radius of Melbourne.

A fine display of native flowers grown at the Melbourne Botanic Gardens was made by the Director, Mr. J. Cronin, and served to show that many of our indigenous plants are worthy of cultivation in our gardens. The exhibit contained examples of the following species:—*Acacia salicina*, var. *fruticosa*, Victoria; *Aphanopetalum resinosum*, Gum Vine, Victoria and New South Wales; *Bauera rubioides*, Wire-scrub, Victoria and New South Wales; *Bauera rubioides*, var. *alba*, Victoria; *Calythrix Sullivani*, Hair-cup Myrtle, Victoria; *Clematis aristata*, var. *Dennisæ*, Victoria; *Commersonia Fraseri*, Blackfellows' Hemp, Victoria and New South Wales; *Dendrobium speciosum*, Rock-lily Orchid, Victoria, New South Wales, and Queensland; *Dianella Tasmanica*, Broad-leaved Flax-Lily, Victoria, New South Wales, and Tasmania; *Dillwynia cinerascens*, Grey Parrot-pea, Victoria, New South Wales, and South Australia;

Eriostemon myoporoides, Long-leaved Wax-flower, Victoria, New South Wales, and Queensland; *Eucalyptus Sieberiana*, Mountain Ash, Victoria, New South Wales, and Tasmania; *Grevillea aquifolium*, Prickly Grevillea, Victoria and South Australia; *G. confertifolia*, Crowded-leaved Grevillea, Victoria; *G. lavandulacea*, Lavender Grevillea, Victoria and South Australia; *G. Miquelianiana*, Miquel's Grevillea, Victoria and New South Wales; *G. rosmarinifolia*, Rosemary Grevillea, Victoria and New South Wales; *Hakea dactyloides*, Finger Hakea, Victoria and New South Wales; *H. microcarpa*, Small-fruited Hakea, Victoria and New South Wales; *Isopogon ceratophyllus*, Horny Cone-bush, Victoria and New South Wales; *Kunzea coriifolia*, White Kunzea, Victoria and New South Wales; *Lhotzkya genetylloides*, Snow Myrtle, Victoria and South Australia; *Livistona australis*, Cabbage Palm, Victoria, New South Wales, and Queensland; *Micrantheum hexandrum*, Box Micrantheum, Victoria and New South Wales; *Olearia myrsinoides*, Myrsine Daisy-bush, Victoria and New South Wales; *O. pannosa*, Velvet Daisy-bush, Victoria and New South Wales; *Pittosporum revolutum*, Curled Pittosporum, Victoria, New South Wales, and Queensland; *Pomaderris lanigera*, Woolly Pomaderris, Victoria and New South Wales; *P. vaccinifolia*, Victoria and New South Wales; *Prostanthera nivea*, Snowy Mint-bush, Victoria and New South Wales; *P. rotundifolia*, Round-leaved Mint-bush, Victoria and New South Wales; *Pultenaea daphnoides*, Large-leaved Bush-pea, Victoria and New South Wales; *P. villosa*, Hairy Bush-pea, Victoria and New South Wales; *Stypandra glauca*, Victoria and New South Wales; *Veronica perfoliata*, Digger's Speedwell, Victoria and New South Wales; *Westringia glabra*, Victoria and New South Wales; *W. rosmariniformis*, Victoria and New South Wales; *Xerotes longifolia*, Long-leaved Mat-rush, Victoria and New South Wales; *Zieria Smithii*, Sandfly-bush, Victoria and New South Wales.

Other exhibits were made as follows:—

By Mr. J. W. Audas.—About 50 species from Ringwood, including *Hibbertia diffusa*, *Olearia (Aster) stellulata*, *Pultenaea scabra*, *Comesperma ericinum*, *Stackhousia linariifolia*, *Billardiera scandens*, *Thelymitra ixioides*, &c.

By Mr. R. Kelly.—About 80 species from Healesville, including *Acacia vomeriformis*, *A. dealbata* (very fine), *Chiloglottis Gunnii*, *Loranthus quandang*, &c.

By Mr. C. Overman.—About 40 species from Dunkeld, including *Conospermum Mitchellii*, *Lhotzkya genetylloides*, *Eucalyptus dives*, *Caladenia carneae*, &c.

By Mr. J. G. O'Donoghue.—About six species from Werribee Gorge, including *Callitris propinqua*, &c.

By Mr. F. J. Thomas.—About 15 species from Beech Forest.

By Messrs. J. R. Tovey and W. L. Harry.—About 36 species from Mentone, including *Aotus villosa*, *Dillwynia cinerascens*, *Podolepis acuminata*, *Prasophyllum clatum*, *Thelymitra longifolia*, *Ricinocarpus pinifolius*, &c.

By Mr. F. Wisewould.—About 36 species from South Gembrook, including *Pultenaea Gunnii*, *Glycine clandestina*, *Caladenia Menziesii*, &c.

VERNACULAR NAMES FOR VICTORIAN PLANTS.—Another portion of suggested names, embracing the orders Rutaceæ—Amarantaceæ, was published in the *Journal of the Victorian Department of Agriculture* for September.

THE LATE MR. FRANCIS BARNARD.—Sympathetic reference was made at the October meeting of the committee of the Club to the death of Mr. Francis Barnard, of Kew, one of the original members of the Field Naturalists' Club of Victoria, elected in May, 1880, and, though he attended but one or two meetings, retained his membership and interest in its doings till his death. He passed away at the ripe old age of 89, on the 21st September. He was best known as an expert microscopist, having been induced to take up that line of study by the late Dr. T. S. Ralph, and in his turn became the tutor of several present-day observers. He devoted some attention to microscopic fungi, one species, *Phragmidium Barnardi*, which he found on *Rubus parvifolius*, being named after him by Dr. C. Plowright, an English authority. He came of a very old English family, traceable with certainty back to the time of Edward III. (1380), and through his mother was a descendant of that famous botanist, Sir James E. Smith, founder of the Linnean Society of London, and who, as the friend of Sir Joseph Banks, became responsible for the naming of a number of the New Holland plants collected by that celebrated traveller.

THE LATE DR. J. C. COX.—Dr. James C. Cox, of Sydney, who passed away on the 29th September at the age of 79, was an hon. member of the Field Naturalists' Club of Victoria, having been elected to that position in August, 1884. He was an enthusiastic conchologist, and in 1866 published "A Monograph of the Australian Land Shells," illustrated by coloured plates, and this year, along with Mr. C. Hedley, F.L.S., contributed "An Index to the Land Shells of Victoria" to the memoirs of our National Museum. He was always willing to help any worker in that branch of natural science, in which he was such a great authority, while his kindly, genial manner endeared him to those who had the privilege of his friendship. He had been for many years a trustee of the Australian Museum, Sydney, and at the time of his death was Chairman of the Board.

NOTES ON THE BREEDING HABITS AND YOUNG OF
THE PLATYPUS, *ORNITHORHYNCHUS ANATINUS*,
SHAW.BY J. A. KERSHAW, Acting Director National Museum,
Melbourne.

(With two Plates.)

(Read before the Field Naturalists' Club of Victoria, 12th Aug., 1912.)

In November, 1910, two young Platypus were forwarded to the National Museum by Mr. H. Quiney. These had been obtained from a burrow on the banks of the Hopkins River, about twelve miles from Mortlake, by Mr. Claridge, overseer on Mr. R. A. D. Hood's station. They were both alive and in perfect condition when received, are quite naked, and the eyes closed. The claws are well developed, the broad membrane of the fore feet of the adult being represented by a slight crenulated fold.

The two specimens measure as follows:—

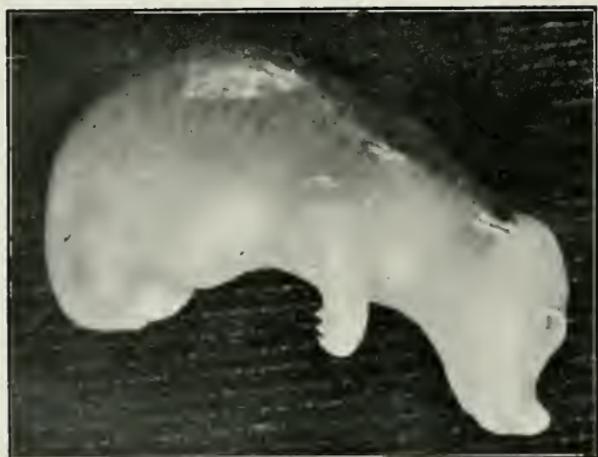
No. 1.—Total length ..	219 mm.
Length of snout ..	13 mm.
Breadth of snout ..	15 mm.
Length of tail ..	28 mm.
No. 2.—Total length ..	216 mm.
Length of snout ..	13 mm.
Breadth of snout ..	14 mm.
Length of tail ..	30 mm.

With the object of obtaining still younger specimens, or, possibly, the eggs, I visited the locality on the 26th October last year, accompanied by Mr. Quiney and Mr. Hood, to both of whom I am greatly indebted for their valuable assistance in my search.

The river, at the spot visited, is a fairly broad, quiet stream, winding about through an extensive grassy flat, margined and shaded with large old Red Gum trees. The banks in places are steep; in others they slope rapidly to the water's edge. At the time of my visit the river was low, but when in flood it rises fully ten or twelve feet.

After a careful search along the banks several burrows were located, places where the soil is easily worked being usually selected. The entrances to the burrows, when once seen, may always be easily recognized. In every instance these were situated some feet above the level of the water, varying from four to fully twelve feet above the present level. In no case did the burrows open out below the water, though during heavy floods several of those seen would certainly be covered. In nearly every instance there was an opening to the surface higher up the bank, and in one case a double opening was found in the same burrow—one immediately beyond the other—the

PLATE VI.



YOUNG OF PLATYPUS.

PLATE VII.



NEST AND EGGS OF PLATYPUS.

narrow ridge of earth separating the two holes being worn smooth, as though the animal, when passing up, came out of one and immediately entered the other. These surface-holes are probably for use during flood times, when the entrance is under water.

Along the steep, muddy bank, close to the water's edge, the tracks made by the animals when passing to and from the water through the grass tussocks were easily recognized, being worn flat and smooth by the animals' wet bodies. Claw marks could also be seen here and there. Such places where the projecting roots of the gum-trees run into the water are, apparently, most favoured for landing.

The entrances to the burrows varied from four to five inches wide and three inches high. They are always arched above and quite flat below, following the shape of the animal's body. This form is followed throughout the whole length of the burrow, though the latter may be enlarged here and there. The entrance is occasionally blocked up with earth.

The burrows do not follow a direct line, but wind about, at times very considerably. They always follow up the slope of the bank, parallel to and rarely more than a foot below the surface. In no instance was one found deeper than fifteen inches, while here and there they approach within a few inches of the surface. A short branch, from one to three feet long, is frequently made on either side of the main burrow; in one instance four were seen—two on either side. These end abruptly, without any apparent cause. Although in the same class of soil, the length of the burrows varies, the shortest examined being ten feet, and the longest, carefully measured, thirty-five feet. While usually terminating in the nest-chamber, the burrow is occasionally continued beyond the nest for a foot or two.

A peculiarity which, I believe, has not been noted before is that when the burrow is occupied it is completely blocked with earth for about a foot. This occurred in three places in one burrow, and is apt to lead one to conclude that the end has been reached. From this it is also assumed that the female does not leave the nest for some time after the eggs are laid or the helpless young are hatched, and during the time the latter are attached to the mother. The object in so securely blocking the burrow is, probably, for protection against flood water in the event of a sudden rise of the river, or from possible enemies. Unless the block is removed from time to time, however, it is difficult to conceive how the animal obtains sufficient air during her lengthened seclusion.

The nest-chamber is rounded in form, the bottom always being much lower than the floor of the burrow, which enters

about its centre. All those examined were of about the same dimensions, the two carefully measured being each twelve inches deep, thirteen inches wide, and eleven inches from the entrance.

The nest itself is composed of fine grass and gum-leaves, and completely fills the cavity. The bottom of the chamber is first covered with a thin layer of grass, followed by a thick layer of gum-leaves about four inches deep, which is continued up the sides, and—at least in one case—completely encircles the cavity, forming a compact circular nest, with the entrance in the side opposite the tunnel. It was noticeable that many of the leaves were green, and appeared to be quite fresh. The bottom of the chamber in every instance was wet, owing to surface soakage, and it is apparently with the object of avoiding this that the bottom of the chamber is excavated below the level of the burrow and so thickly lined with leaves.

The first burrow examined had been opened up by Mr. Hood on the 17th October (nine days prior to my visit), and from the nest two fresh eggs were taken. These, when found, were attached to one another, and had been kept in a small box; but in two or three days they collapsed. When I received them on the 26th October they were flattened and dry. Several other burrows close by, though having the appearance of recent occupation, were untenanted, but each contained a nest, more or less complete. From one of these the shrivelled remains of two eggs were obtained.

Later in the day a burrow was discovered which had every appearance of being occupied. It was situated on the sloping side of the bank, fully twenty-five feet from the water, and was the only one I saw with recently scratched earth at the entrance. The burrow followed up the slope of the bank for about twenty-five feet, terminating in a nest-chamber, some ten or twelve feet above the level of the river. This one was blocked up in three separate places, the last within three feet of the nest. When about a foot from the nest a peculiar grating growl was heard, and the next shovelful of earth exposed the side of the very compact structure, through which the old one hurriedly forced her way. She was permitted to traverse the excavation for a couple of feet to a depression, where she was covered with clods of earth, while a careful examination of the nest was made. This proved to be the most complete of all those examined, the whole cavity being completely filled with leaves. No opening into the interior of the nest could be seen, the entrance being evidently closed by the animal during occupation. As was the case in all those examined, it was composed of gum-leaves, with a small layer of grass at the bottom of the chamber. The lower portion was tightly compressed from the

weight of the animal, while those forming the sides and top were loosely interwoven. The interior measured six inches across and four and a half inches deep. The shrunken remains of one egg were found in the nest.

On releasing the animal from the trench, and partly raising her by the tail, a small white object was noticed attached to the abdomen in the region of the pouch. This, on a closer examination, and greatly to my surprise, proved to be an exceedingly small young one, so securely attached to the skin as to require a little force to detach it. I then remembered that, when raising the animal, a small object was seen to drop into the trench, where a short search revealed a second young one.

An examination of the female did not disclose any defined pouch or fold, though the hair was very thin where the embryos had been attached.

Considering the extremely small size of the embryos, which, when coiled up in the manner peculiar to very small marsupials, only measured about 15 mm., it was surprising they had not been dislodged during the sudden rush of the mother through the nest, or while she was temporarily enclosed in the trench. Wishing to bring them alive to Melbourne, they were carefully placed in cotton wool, but only lived for about twelve hours. The total length of one of the specimens preserved in spirits is 30 mm. The tail measures 3 mm.

The adult is surprisingly rapid in its movements on land, and when released from its burrow at once makes off in the direction of the water. Throughout the night it kept up a continuous scratching against the sides of the box in which it was confined, but during the day it remained quiet. When walking it seemed to bend the fore-claws under the foot, giving it the appearance of walking on its knuckles, the broad fleshy membrane, used only while swimming, being doubled back.

The soft tip of the snout is extremely sensitive, the animal showing a strong dislike to even a touch with the finger.

The result of my search showed that, at least in this locality, and contrary to the generally accepted belief—

There is no entrance to the burrow below the water-line, but in flood-time, when the river rises considerably, the entrances to some of them would be below the water.

That many of the entrances were situated so high above the usual water-line that they would only be immersed during exceptionally high floods.

That some of the burrows had outlets on high ground in addition to that lower down and nearer the water.

That it is apparently essential that the nest be placed well beyond the reach of the water, and must be dry.

That, considering the extremely small size of the embryo, and the fact that it is not protected in a pouch, the mother does not leave the nest for some time after the hatching of the young, but secures herself against flood waters or possible enemies by blocking the burrow in several places.

That the young are hatched out in October.

ADDENDUM.—Since reading the above paper, I have, through the kindness of Mr. R. A. D. Hood, had another opportunity of visiting the same locality, and was fortunate in being able to examine a number of new burrows. My object on this occasion was to obtain, if possible, the eggs, and, in view of my previous experience, made my visit four days earlier—viz., on the 22nd October. The result of my search was the discovery of three eggs, two of which were obtained from one nest and one from another. These were taken in the nest cavity, after the female had been removed. In each case the female was carefully examined, and no indication of a pouch or even fold of the skin could be seen. The eggs are almost round, of a dirty yellowish-white colour, with a soft membranous covering. The pair taken in one nest measure 18 x 15 mm. and 16 x 14 mm., while the single egg measures 18 x 15 mm. On exposure it was noticed that they showed a tendency to quickly shrink, and while being held on the open hand for only a few minutes the outer covering became indented. The two eggs found in the one nest were firmly and broadly adhering to one another, as shown in the accompanying illustration. It is rather curious that the pair taken by Mr. Hood, and mentioned above, were attached in exactly a similar manner. The entrances to the burrows were, as already described, situated some distance above the river, and there was usually an additional outlet higher up the bank. Although the animals are more frequently seen in the river during the evening or early morning, it is not an uncommon occurrence to see them swimming about during the middle of the day.

PERSONAL.—We have to congratulate Mr. J. A. Leach, M.Sc., president of the Field Naturalists' Club of Victoria, on his attainment of the degree of D.Sc., awarded on a thesis entitled "The Morphology of the Strepera and its Position in Classification"; also Mr. P. R. H. St. John, who has been awarded a University research scholarship of £50, under Prof. Ewart, to carry out investigations regarding "The Distribution of Different Species of Eucalypts in Victoria, and their Relation to One Another."

FOREST PRESERVATION.—An effort is being made to arouse public interest in our rapidly disappearing forests, and an influential provisional committee was appointed at a public meeting held in Melbourne on the 28th October to organize a forest league. Membership was fixed at the nominal sum of 2s. 6d., and Dr. C. S. Sutton, North Carlton, who is acting as hon. secretary, will be pleased to enrol any persons interested.

"THE AUSTRAL AVIAN RECORD."—In No. 3 (June, 1912) of this publication, the editor, Mr. Gregory M. Mathews, acknowledges the unsigned articles in the previous parts as having been contributed by himself. The fourth number (September, 1912) is to hand, with a further batch of trinomial sub-species of Australian birds by the editor, and numerous emendations of names previously published by him, so that a copy of Mr. Mathews' "Reference List of the Birds of Australia" brought up to date by pen alterations must now present a rather tangled appearance.

THE NAMING OF SEA LAKE.—I note in this month's *Naturalist* the question was asked at the last meeting of the Club as to the origin of the names of Sea Lake and Green Lake. Many others have asked the same question. I have made some inquiries, and in conversation with Mr. Jas. Mudge, J.P., an old resident with an extensive knowledge of the district, he stated that Sea Lake owed its inappropriate title to the following trivial circumstance :—"When this part of the Mallee was resumed by the Government from the squatters, and was being 'cut up' into agricultural allotments, an officer of the Lands Department was sent to report on the township site, and on the plan supplied to him was marked the words, 'See Lake,' as a reminder to personally inspect the lake, and report on the suitability of the same as a water supply for the township. 'See' became 'Sea,' and thus the new settlement was named." Green Lake, better known as Green Swamp, was so named on account of the verdant appearance of its banks and surrounding country during good seasons. Like Sea Lake, it is surrounded by a narrow but dense belt or grove of Box trees, with Murray Pine and Bull-oak, and would make an ideal sanctuary for wild fowl were it but protected from the everlasting "pot-hunter." Under the trees on its margin I have seen lying dead, wantonly shot and left to lie, the beautiful Nankeen Heron, Magpie-Lark, Black-tailed Tribonyx, and other harmless and rare birds. I think the Club should move in the matter, and try to get Green Lake proclaimed as a sanctuary. There are plenty of rabbits and hares, sparrows, parrots, and crows for the "sportsmen" to try their skill on.—J. C. GOUDIE. Sea Lake, 12th September, 1912.

"THE AUSTRALIAN NATURALIST."—The October part of this publication announces the amalgamation of the New South Wales Naturalists' Club and the Flora Society under the new name of "The Naturalists' Society of New South Wales," but why has not the new society altered the name of its journal to correspond with that of the society, and thus indicate the particular part of Australia it is connected with. The journal, which contains a number of interesting articles and notes, is now edited by Mr. T. Steel, F.L.S., a former member and office-bearer of the Field Naturalists' Club of Victoria.

MOUNT MACEDON.—Bulletin No. 24 of the *Geological Survey of Victoria*, recently issued, is devoted to "The Geology and Petrology of the Macedon District," by Professor E. W. Skeats, D.Sc., and Mr. H. S. Summers, M.Sc., illustrated with twenty-eight plates and a map. The authors deal very fully with the many interesting points suggested by the numerous geological formations which occur in the district. The geologically coloured map issued with the bulletin covers an area of about 140 square miles, and on it no less than eighteen formations are indicated. The central portion of the map shows a large area of dacite, which includes Mount Macedon, the Camel's Hump, which, however, is an intrusion of solvsbergite, and Mount Towrang. South-east of this is an area of granodiorite, while to the north is a dislocated area of anorthoclase trachyte. Almost surrounding these is an area of ordovician. The other principal formations shown are normal, and other varieties of basalt, buckshot gravel, and here and there patches of alluvium and hill wash. The physical geography of the district is dealt with in an interesting manner, but the most important portion of the contribution is necessarily that devoted to the petrology. The authors have arranged the formations into three main groups of rocks, viz., sedimentary, igneous, and metamorphic. These are subdivided into twelve series. Thus the sedimentary rocks are dealt with under the sub-headings of Ordovician Sediments, Kerrie Conglomerates, Kainozoic Deposits, Alluvium, and Buckshot Gravel; under igneous rocks we have the Dacite Series, Granitic Series, Alkali Series, and Basalt Series; while the metamorphic rocks are divided into Altered Ordovician Sediments, Altered Kerrie Conglomerates, and Altered Dacite. In the alkali series two new rocks are described—Macedonite and Woodendite—taking their names from the places of occurrence. Fourteen plates are devoted to photo-micrographs of sections of various rocks, while five plates reproduce photographs of typical scenes of the district. The bulletin, which is issued by the Mines Department at one shilling, will form a most useful handbook for any geological student visiting the district, and represents the vacations of some six years spent in hard work among the Macedon hills.

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DECEMBER 5, 1912.

No. 348.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 11th November, 1912.

Mr. J. A. Kershaw, F.E.S., one of the vice-presidents, occupied the chair, and about 40 members and visitors were present.

REPORTS.

A report of the excursion to Laverton on Saturday, 19th October, was given by the leader, Mr. C. French, jun., who stated that an interesting afternoon had been spent in traversing the district between Laverton and North Williamstown. At Altona Bay several old aboriginal camping-grounds were visited, and some stone relics obtained.

A report of the excursion to Alphington for pond-life on Saturday, 26th October, was given by the leader, Mr. J. Searle, who reported a very profitable afternoon, a large variety of specimens of microscopic life having been obtained.

A report of the excursion to the You Yangs on Tuesday, 5th November (Cup Day), was given by the leader, Mr. F. G. A. Barnard, who said that the party had experienced a most unpleasant day, a strong wind prevailing all day, and rendering rambling among the rocks dangerous at times, consequently the natural history results were practically nothing. The parts visited were almost the same as on the previous excursion in November, 1908, which was fully reported in the *Naturalist* of the following month. The party was rather small, but it included two ladies, who expressed themselves pleased with the ten-mile walk, notwithstanding the unpleasantness of the weather. The typical shrub of the foothills, *Prostanthera nivea*, is a charming sight when in flower, but, probably on account of the dry spring, was just passed its best. On the hills the Blue Gum, *Eucalyptus globulus*, was better in flower than on many previous visits, while many of the Black Wattles, *Acacia mollissima*, were in fine bloom, and scenting the air for many yards round.

A report of the excursion to Coode Island on Saturday, 9th November, was given by the leader, Mr. J. R. Tovey, who said that a fairly large party of members, including several ladies, had availed themselves of the opportunity of a motor-boat trip to the island in order to see how the numerous accidentally-introduced plants behaved in their new surroundings. It was

noted that, as on the previous excursion, reported in the *Naturalist* for May last, many of the plants that were in flower had been recorded as flowering at other periods of the year, showing that they had not yet settled down to our seasons. The exotic *Galenia secunda* (N.O. Ficoideæ) was flowering in great profusion, the flowers being of various shades from pink to white. Fully sixty exotics were noted either in flower or fruit, at least three of which seem to be unrecorded introductions. In an enclosure near the quarantine station several native plants, such as *Dillwynia ericifolia*, *Lepidium ruderale*, *Didiscus pilosus*, &c., were found in bloom.

The junior excursion arranged for Springvale for Saturday, 2nd November, under the leadership of Mr. C. French, jun., had to be abandoned owing to inclement weather.

ELECTIONS.

On a ballot being taken, Masters T. A. Alexander, "The Grange" School, South Yarra, and T. Weigall, Ninian's-road, Brighton, were duly elected junior members of the Club.

GENERAL BUSINESS.

Dr. T. S. Hall, M.A., drew the attention of members to the forthcoming meetings of the Australasian Association for the Advancement of Science, to be held in Melbourne in January, 1913, and emphasized the advantages of these meetings, especially to the younger members, who would have opportunities of meeting many of the leaders of science from other States.

Dr. Sutton, whilst stating the objects of the newly-formed Forests League, pointed out the evil effects resulting from forest denudation.

Mr. J. Gabriel related the wasteful methods of wood-cutters in the Bendigo district fifty years ago, and contrasted them with the systems in operation in the forests of Germany and Russia.

Mr. A. D. Hardy, F.L.S., briefly outlined the work that had been done in Victoria by the Forests Department, and explained the working of the *Forests Act*.

PAPER READ.

i. By Messrs. J. G. O'Donoghue and P. R. H. St. John, entitled "Further Notes on the Brisbane Range."

The authors, in an interesting paper, described a rather extensive trip taken in September, 1911, with the view of adding to the ornithological and botanical records of the district. Starting from Lara, they bore north-westerly towards Sutherland's Creek, where they obtained specimens of a eucalyptus which may prove to be a new species. Passing on through

Steiglitz, they camped out for the night near the Geelong reservoir, and next day resumed the walk through the range proper, noting a number of interesting birds and plants on the way, finally entraining for home at Parwan. The additions made to the lists of birds and plants increased the respective totals to 104 and 358.

Mr. F. G. A. Barnard congratulated the authors on the work that they were doing in the Brisbane Ranges, and suggested that a camp-out might be held in that locality at some future date.

Dr. T. S. Hall, M.A., also congratulated the authors on what they had accomplished. He was greatly surprised at the amount of country that they had covered in the two days' walk, and mentioned that a fault scarp extended through the district in a north and south direction for about nine miles.

Mr. J. A. Kershaw, F.E.S., agreed with the previous speaker regarding the amount of country passed through. He thought that the suggestion to hold a camp in the locality would meet with general approval, provided that it was confined to a workable area.

2. By Messrs. F. Chapman, A.L.S., and R. A. Keble, entitled "Note on the Age of the Fossiliferous Ironstone Beds at Landslip Point, Frankston."

This paper was, with the permission of the meeting, withdrawn for the purpose of being incorporated in a more comprehensive article to be presented shortly.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Dried specimens of the Nodding Blue Lily, *Stypandra glauca*, R. Br., white-flowering form, collected at the Grampians; and double-flowering form of Common Heath, *Epacris impressa*, Labill., red variety, also from Grampians.

By Mr. F. G. A. Barnard.—Flowering branch of Blue Gum, *Eucalyptus globulus*, Labill., from You Yangs excursion; also growing plant of *Lomaria vulcanica*, a Tasmanian fern.

By Mr. J. E. Dixon.—Fifty-five species of coleoptera and six species of reptiles from Ouyen, North-Western Victoria, collected during the month of October.

By Mr. C. French, jun.—Typical specimen of the Red Wattlebird, *Acanthochæra carunculata*, Lath., also a very light-coloured specimen from Doncaster, and an albino from South Gippsland; also small parasitic hymenoptera, destructive to cut-worm and other caterpillars, collected in pupal stage at Coode Island excursion on the previous Saturday, but now emerging; also the rather rare buprestid beetle, *Melobasis superba*, from same locality.

By Mr. R. Kelly.—Specimens of various acacias in seed, and of *Acacia mollissima* in bloom.

By Mr. J. Searle.—A new copepod, *Asymmetrica*, sp., collected on Alphington excursion.

By Mr. P. R. H. St. John.—Dried specimens of *Eucalyptus linearis*, Dehnhardt, syn. *E. pulchella*, Desfont., collected by Mr. L. Rodway, Government Botanist, Tasmania; *Levenhookia Sonderi*, F. v. M., "Slender Style-wort," collected by exhibitor at Eltham, 9th November, 1912; growing plant (in bloom) of orchid, *Diuris punctata*, Smith, var. *alba*, White Diuris, collected by exhibitor at Sydenham, 26th October, 1912.

After the usual conversazione the meeting terminated.

EXCURSION TO LAVERTON.

ONLY a small number of members took part in the excursion to Laverton on Saturday, 19th October. The locality is, perhaps, not very inviting, being portion of the well-known Werribee Plains; but, as the natural history on the western side of Melbourne is of so different a character to that met with in the localities usually visited to the east of the city, it is as well to sometimes arrange an excursion to the district. On leaving the station we walked along the railway enclosure for about a mile towards Altona Bay, finding a number of plants were in flower, but nothing of any great rarity was noticed. Reaching Altona Bay, several old aboriginal camping-grounds were visited, and, after some searching, a few interesting stone relics were obtained. Growing in the sand near the coal mine were a number of plants of the introduced weed, *Silene cucubalis*, N.O. Caryophylleæ, "Bladder Wort" or "Bladder Champion." On pulling up some of these we were surprised to find their roots to extend to five or six feet in length—rather remarkable for such a comparatively small plant. On the beach were found two birds which had been washed up by the tide—a Short-tailed Petrel or Mutton-bird, and a White-faced Storm-Petrel—two species which occur in considerable numbers about Port Phillip Heads. Mr. C. C. Brittlebank, Acting Government Vegetable Pathologist, has identified some micro-fungi collected as *Uromyces pucciniodes* on the *Silene*, *Phyllachora trifolii* on the leaf of a trefoil, and *Puccinia hypochæridis* on *Hypochaëris radicata*. During our ramble two Tiger Snakes, *Hoplocephalus curtus*, were seen, one of which was killed; the other escaped into some tussocks. Mr. J. R. Tovey, of the National Herbarium, who devoted his attention to the plants, says at least seventy species were seen, of which the more interesting were:—*Kennedya prostrula*, *Pimelea glauca*, *P. humilis*, *P. curviflora*, *Brachycome calocarpa*, *B.*

graminea, *Cotula coronopifolia*, *C. integrifolia*, *C. silicifolia*, *Craspedia chrysantha*, *C. Richea*, *Trichinium spathulatum*, *Asperula scoparium*, var. *conferta*, *Sebea albiflora*, *Wilsonia rotundifolia*, *Podolepis acuminata*, *Helichrysum apiculatum*, *H. scorpioides*, *Gnaphalium luteo-album*, *Leptorrhynchus squameus*, *Helipterum dimorpholepis*, *Gahnia filum*, *Convolvulus erubescens*, *Minuria leptophylla*, *Erythraea australis*, *Veronica gracilis*, *Vittadenia australis*, *Geranium dissectum*, *Linum marginale*, *Isotoma fluviatilis*, *Velleya paradoxa*, *Goodenia pinnatifida*, *Samolus repens*, *Millotia tenuifolia*, *Salicornia australis*, *Angianthus Preissianus*, *Thelymitra longifolia*, *Anthistiria ciliata*, *Wahlenbergia gracilis*, and *Cuscuta tasmanica*. Among the introduced plants noted were *Bartsia latifolia*, *Salvia verbenaca*, *Hedypnois cretica*, *Erodium cicutarium*, *Diplotaxis muralis*, *Cynara cardunculus* (*C. scolymus*), *Carduus pycnocephalus*, *C. mariannus*, *Bromus maximus*, and *Silene cucubalis*. We returned from North Williamstown, which was reached about 6 p.m., after an interesting walk of about six miles.—C. FRENCH, JUN.

EXCURSION TO ALPHINGTON.

FOR this excursion, on Saturday, 26th October, we were joined by several members of the Microscopical Society of Victoria, for whom the life in the ponds at Alphington had more attraction than life on the river at Henley. The afternoon turned out delightful for our purpose, and the ponds visited were in perfect condition, the quantity and variety of life they presented being very gratifying to the collector, each dip of the net bringing to view new forms of life. Many beautiful as well as ferocious and curiously-shaped larvæ were noted, and much speculation was indulged in as to what form some of these would assume after completing their metamorphoses. Grouped under the general term of "worms" several interesting forms were met with. Of the *Naïdidae*, a species closely resembling *Nais lacustris* was very common, and was observed in the act of budding or fission. Another interesting worm, a Turbellarian, cruciform in section when swimming, and probably identical with *Mesostoma tetragonum*, was common. In many of the specimens both developing and resting eggs could be seen. Many planarians and other leech-like forms were noted, and it is a pity so little work has been done here on this group. A rich field is waiting for someone to investigate, and I would strongly urge some of our members to take up the work. Entomostraca were particularly numerous, most of the known species of Copepoda being represented, as well as others, two of which are likely to prove to be new. Many of the less

common forms of Cladocera were taken, including *Bosmina* and *Ceriodaphnia*, but *Daphnia carinata*, usually so plentiful, was conspicuous by its absence, not a single specimen being seen. A search was made for a rare form of Cladocera, possessing an arrow-shaped head, single specimens having been taken in these ponds at wide intervals during thirty years' collecting ; but so far our search has been unrewarded. Of the Phyllopoda, *Lepiduris viridis* and *Eulimnadia dahli* were taken. Ostracoda were numerous, but mostly small species, *Cypridopsis minna* being the most common. Among the Rotifera large numbers of a very large species of an Asplanchna (both male and female forms) were taken, also three forms of Anuræa, a few clusters of Lacinularia, and the tube-builder, *Melicerta*. *Volvox* was present in all the ponds. The commonest water plants were *Myriophyllum* and an aquatic *Ranunculus*, the latter just coming into flower, while from the swampy ground plants of the Nardoo, *Marsilea quadrifolia*, were secured for home cultivation. The varied tints of the young foliage of the gums and acacias were greatly admired by the ladies of the party, while the melody of song from the throats of many beautiful native birds, assisted by that great soloist the English Skylark, was gratifying to all. Laden with material for home study, the party returned homewards well pleased with their outing.

The following is a list of the specimens identified :—
 Phyllopoda : *Lepiduris viridis*, *Eulimnadia dahli* ; Cladocera : *Simocephalus gibbosus*, *Daphnia mucronata*, King, *Bosmina rotunda*, (*Scapholiberis* ?), *Moina globosa*, *Ceriodaphnia*, sp., *Chydorus*, sp., *Alona*, sp., *Pleuroxis*, sp.; Copepoda : *Boeckella minuta*, *B. oblonga*, *B. symmetrica*, *B. saycei*, *B. triarticulata*, *B. insignis*, *B. asymmetrica*, n. sp., *Brunella viridis*, *Hemiboeckella scarlei*, *Cyclops australis*, *C. leuckarti*, *C. albidus*, *Attheyella australica* ; Ostracoda : *Cypridopsis minna*, *Cypris leana*, *Candanopsis*, sp. ; Amphipoda : *Chiltonia australis* ; Isopoda : *Janirilla pusilla* ; Rotifera : *Asplanchnopsis*, sp., *Asplanchna*, sp., Anuræa (three forms), Lacinularia, sp., *Melicerta ringens* ; *Volvox*, sp. ; Turbellaria : *Naïdidæ*, *Nais lacustris* (?).—J. SEARLE.

A.A.A.S.—The 1913 session of the Australasian Association for the Advancement of Science will be held at the Melbourne University from 7th to 14th January next. Intending members should communicate with Dr. T. S. Hall, hon. sec., University. In addition to the presidential address and the sectional addresses, which are perhaps more important than the papers to be read, excursions and visits to places unaccessible to the average resident are being arranged.

CONCERNING ACACIA PHYLLODES.

BY REGINALD KELLY.

(Read before the Field Naturalists' Club of Victoria, 14th Oct., 1912.)

LEAVES, according to Dendy and Lucas, pp. 147-8—to use a reference easily available—are lateral outgrowths from the stem or branch, specially modified and adapted organs for purposes there detailed. Their tissues are continuous with the corresponding structures of the stem. “A leaf of the most specialized type consists of a flat expansion—the blade or lamina—which is attached to the stem by a narrow stalk or petiole. . . . There is no distinct mark of separation in young leaves between the stem and the petiole or between the petiole and the lamina. The stem rises up into the petiole, and the petiole widens out into the lamina. In some older leaves transverse layers of cells are formed, which definitely mark off these regions from one another. The transverse layer of cells is called an articulation or joint, and the leaf is said to be articulated. The petiole ultimately becomes articulated to the stem in all deciduous stalked leaves, and the blade, or its parts, are articulated to the petiole in such leaves as those of the orange, the ash, and the acacia. . . . The amount of differentiation of the petiole and lamina is by no means the same in all plants. In the orange a broad petiole bears a broader lamina, separated from it by an articulation; both parts of the leaf are here blade-like. In many of the acacias the petiole is broad and blade-like, and only bears a lamina in the seedling plant. In a full-grown shrub or tree the broad petioles are alone produced; these perform all the functions of leaves, and are termed phyllodes. The phyllode can be recognized as a petiole and not a leaf by comparing its structure with that of the undoubted petiole in the seedling leaves: the arrangement of the fascicular bundles in parallel veins is the same in both.”

Is it, then, a fair deduction from that authority that the practicable discernible difference between true leaves and phyllodes lies in the arrangement of the fascicular bundles, and whether they are in parallel veins or reticular or branched from a midrib (which, after all, is only a glorified vein), there seems so little difference as almost to force the conclusion that the parallel-veined leaves of the monocotyledons are not true leaves, but phyllodes. The real difference between leaves and phyllodes, I think, is to be found in the history of their structure, and it is with this that I propose mainly to deal.

Acacias as we now find them have—

- (a) Bipinnate leaves in both the adult and the juvenile states, as illustrated by the *decurrens* group; or

- (b) Obsolescent bipinnate leaves on the young plant, soon replaced by the broadened or spinescent stalk, with rarely, if ever, a sign of pinnate leaf afterwards : or
- (c) Phyllodes, as on the Blackwood, *Acacia melanoxylon*, in which vestiges of the pinnate leaves appear at the ends of the broadened petioles for some time during the growth of the tree, and which recur in more or less profusion on wounded boughs, suckers, and parts affected by galls. In the last-mentioned case the pinnate leaves sometimes form concrescent masses, and at other times irregular tufts and branches.

The following reference is made to the seedling leaves and vestigial pinnate leaves of *Acacia salicina* in Lubbock on "Flowers, Fruits, and Leaves" (pp. 119-121) :—"In tropical countries some plants, at any rate, find the sun too hot for them. In illustration of the present point perhaps the clearest evidence is afforded by some Australian species, essentially the eucalypti and acacias. Here the adaptations which we meet with are directed, not to the courting but to the avoidance of light. The typical leaves of acacias are pinnate, with a number of leaflets. On the other hand, many of the Australian acacias have leaves (or, to speak more correctly, phyllodes) more or less elongated or willow-like. But if we raise them from seed we find, for instance in *Acacia salicina* (so called from its resemblance to a willow), that the first leaves are pinnate, and differ in nothing from those characteristic of the genus. In the later ones, however, the leaflets are reduced in number, and the leaf-stalk is slightly compressed laterally. The fifth or sixth leaf, perhaps, will have the leaflets reduced to a single pair, and the leaf-stalk still more flattened, while, when the plant is a little older, nothing remains except the flattened petiole. This in shape, as already observed, much resembles a narrow willow leaf, but flattened laterally, so that it carries its edge upwards, and consequently exposes as little surface as possible to the overpowering sun. In some species the long and narrow phyllodes carry this still further by hanging downwards, and in such cases they often assume a scimitar-like form. This, I would venture to suggest, may be in consequence of one side being turned outwards, and therefore under more favourable conditions."

The same writer goes rather far in saying :—"In one very interesting species, *Acacia melanoxylon*, the plant throughout life produces both forms, and on the same bough may be seen phyllodes interspersed among ordinary pinnate leaves, the respective advantages being, it would appear, so equally balanced that sometimes the one, sometimes the other, secures the predominance."

Goebel ("Organography of Plants," part ii., pp. 353-7) discusses this leaf-history in an interesting manner, and refers to the adaptation against loss through intense transpiration in *Viminaria denudata*, and also to phyllode characteristics in the Cassias. He illustrates also from the leaf features of *Hakea trifurcata*. This genus affords an interesting field for leaf investigation. Take, for instance, the leaf of the well-known Cushion Flower, *Hakea laurina*. It is rarely, if ever, spoken of as a phyllode, yet, on examination, it appears with its straight veins as much one as any acacia. Referring to the acacia, Goebel says:—"The leaf lamina is not in a condition in which it could change in response to the requirements of the environment, whilst the leaf-stalk, which arises, as we know, at a later period in the course of the development, remains more plastic. Outer conditions form a stimulus. The primordium of the lamina is always present in the phyllode, although, in most cases, its capacity for development is limited only to the seedling plant. In some species, such as *A. alata*, the lamina can always be seen in a vestigial state upon the phyllode. It becomes stationary and arrested."

The earliest leaf form we have in the race-history of the acacia is bipinnate. This form, we are taught, is highly specialized, and is evolved from the entire form by gradations through the serrate, crenulate, and lobed forms, until the great surface aggregate of doubly-feathered leaves is attained. It is a fair conclusion, then, that the bipinnate leaves of the *A. decurrens* group were derived from leaves with entire margins, probably shaped like the broader phyllodes found on other species to-day. Were it not that we find now on those phyllode-bearing species seedling and obsolescent pinnate leaves, it would be a natural conclusion that the *decurrens* group was the farther advanced in foliage evolution—at least, so far as its morphology is concerned. This would be true, too, if the phyllode were not only a regression but also a degeneration. The phyllode, however, is an adaptation to environment, and consequently must be progressive, yet it is probably also a regressive form, whose recapitulation is embodied in the cotyledons of the embryo; but it is also progressive.

Let me draw an illustration from politics. A. is premier to-day. In his absence B., one of his ministers, is acting-premier. While these circumstances exist, A. is the real premier. Later on A. retires altogether, and B. succeeds him. B. is then the real premier. A.'s premiership is only a fact of past history. As soon as one form of foliage is completely superseded by another, the latter takes the place and performs the functions of the former leaf. This new form is the true

leaf, no matter how unconventional its character, how crude its shape, or how much it differs from our preconceived ideas. For a while it was only an acting leaf—the old one retained for a time a semblance of its old reality, but eventually passed out. The old order changed, and gave place to the new. But was it new? Once, at least, before it may have been the typical leaf of the genus and have been passed out itself. The ministry had been reconstructed before. How many times, and why these changes? How did the new form persist? How is it that now so many distinct forms grow side by side? The species with bipinnate leaves grow cheek by jowl with species variously phylloded. It cannot be supposed that this was always the case, for then the theory of environment goes by default. Why, then, these changes and the multitude of species? We must not disregard the world distribution of the genus. It is not exclusively Australian. We cannot altogether fall back on that Mesopotamia of Australian science—the cataclysm that cut off Australia from the rest of the world. It counts, however, for something. Those that remained on the mainland, spreading latitudinally, developed into the acacias of Africa, whilst the mimosa forms of tropical America either tell of parallel progression or indicate the age of the pinnate type.

The genesis of Australian species is more than enough to speculate upon, and, as they tell their story in cryptic language, imagination must play some part in its interpretation. As all the extra-Australian species are pinnate, we can assume, though not with absolute certainty, that this continent contained the pinnate form ever since Australia stood alone. We can also assume that it possessed a phyllode species before Tasmania was severed from the mainland, seeing that the island State possesses both forms; and, if we accept the view of the authorities that the change from what they call the normal leaf to the flattened petiole was brought about by the struggle of the plant to prevent too rapid transpiration, we can scarcely see that that necessity arose in the mild climate of Tasmania. Both forms, therefore, probably went over with the severance, which phyllodization, therefore, antedates. It is with the last change—the one still in many species incomplete—that I am most immediately concerned. If there were former ones it will suffice for the present that history is repeating itself. We must take ourselves back in imagination to the time when Australia possessed only the normal or pinnate type, in one or more species, established by environment from a common parent.

It would appear that *Acacia farnesiana* is, so far as our knowledge goes, the original acacia from which the various

species of the world arose. Its claim to this distinction is that it is the only Australian acacia now common to the New and Old Worlds, and is found more or less near to the habitats of all acacias. All other species are endemic. The phyllodinous type is peculiar to Australia and some adjacent islands. The island species are not identifiable with Australian species, but are near to tropical types. In Australia *A. farnesiana* is distributed over North Australia, Queensland, and the interior of New South Wales, towards Cooper's Creek. It is thought by some to be of American origin, and by other authorities as indigenous to Africa, but it indeed appears to be so to Australia. *A. farnesiana* is a much-branched shrub of considerable size, and pinnate; the stipules are converted into slender, straight thorns, varying from $\frac{3}{4}$ -inch long to minute, and sometimes to none. I am indebted to Bentham's "Flora Australiensis" for this information, and to Mueller's "Extra-Tropical Plants" for the following extract:—" *A. farnesiana*, Dioscorides' small acacia. Indigenous to South Asia; found westward as far as Japan; a native also of the warmer parts of Australia as far south as the Darling River; found spontaneously in tropical and sub-tropical America, but apparently not in tropical Africa. Professor Fraas has recognized in this acacia the ancient plant."

The original Australian habitat of *A. farnesiana*, though tropical, was not arid. The deserts of Australia were at that time probably seas, which subsequently receded. The climate, inland at least—that is, between these sea-beds and the coast—became more arid. Acacias growing there suffered season after season from drought. The delicate feather-leaves fell during years of suffering. Fresh shooting leaves necessary to supply carbon dioxide from the air were too few to perform the necessary functions. It was a struggle for existence—the old struggle of the evolutionary theory. The plant fought for food and breath, putting out little lateral processes on branch and leaf-stalk, evidenced now by the decurrent ridges and the flattened petiole. The plant survived, and extended the process. The leaf-like one was found the best. Take another stage in the history: The tree bore seed. The resulting young plants bore first the little leaves of its forebears. The environment was still the same, the struggle as great; the process was repeated. Similar struggles were going on in different individuals widely separated and in varying environments. Naturally, the results varied. Generation succeeded generation; seeds were transposed to many parts by the different agencies—principally by birds. Some may have been carried back to an environment in which the pinnate leaf type was ideal, and had remained normal. We now came face to

face with one of the most difficult problems of heredity. Would these acquired characters persist? They have done so. By this time climatic changes, more or less, may have come about throughout the island continent. The adaptation may have been as suitable in any district as the normal condition. The acquired character may have become so well fixed as to pass by inheritance; or, as all organic nature has in itself, dormant or active, the highest capacities of its kind, each species would have the power to continually adapt itself to circumstances and to retain either its adopted form or revert as conditions necessitated—be the way weary and the process slow. Thus all species of acacias were at one time merely endemic varieties, and are still subject to change. Note how they fluctuate in cultivation or in sporadic growth. See how, even in their apparent homes, the phyllodes vary even on one tree in size, in shape, in texture. They conform to no standard; they are undrilled, undisciplined; they struggle still for uniformity and the dead level of the orthodox.

Measurements of the phyllodes of many plants taken show a great variability in size even on the same bough, to say nothing of those on the same tree. On one branch phyllodia of *A. pycnantha* varied from 84 lines x 33 to 95 x 7; on *A. melanoxylon* (Blackwood), from 50 x 18 to 35 x 8; on *A. penninervis*, from 72 x 24 to 51 x 8; on *A. leprosa*, from 4 in. x $\frac{3}{4}$ in. to $1\frac{1}{2}$ in. x $\frac{1}{8}$, and in cultivated species to almost linear; on *A. saligna*, from 108 x 3 to 108 x 7; on *A. linearis*, from 7 in. x $\frac{1}{8}$ to $3\frac{1}{2}$ x $\frac{1}{4}$ to $9\frac{1}{2}$ x $\frac{1}{8}$; on *A. diffusa*, from $1\frac{1}{2}$ in. x $\frac{1}{16}$ to $\frac{1}{4}$ in. x $\frac{1}{20}$ inch.

The acacias, in common with other life, possess the power of achieving the limit of perfection, and this particular genus truly according to its light. They are exercising this power in a revolutionary way. They do not intend to be, as to their leaves, outside of conventional rules. Circumstances robbed them of their leaves and gave them deformities, flattened leaf-stalks, and really, in some cases, dilated midribs. The midrib or the petiole, as the case may be, has split up and expanded like a fan or web foot, always more rather than less constricted, carrying the leaf tissue as the web instead of allowing it to grow in its ordinary manner, as though it had forgotten. In *Acacia acradenia* the veins or ribs diverge from one thickened edge or leaf-stalk, and are like a half leaf, that edge taking the place of a midrib. Professor Ralph Tate, in describing *A. lysiphloia*, a Finke River species, refers to the "leaves." Mueller, in his "Iconography," calls them "phyllodes." The inference is that Tate considered the phyllodes of this species had completed the cycle. The phyllodes of *A. aneura* vary from cylindrical to flat. In *A. latifolia* the nerves branch off

from the main nerves as veins from a midrib. This is also seen in *A. dallachiana* and in *A. alpina*. In *A. Doratoxylon* the central nerve is more prominent, the others slight. *A. conjunctifolia* may be a stage between *A. Baileyana* and *A. verticillata*, or, indeed, more advanced still.

The history of one species is, except as to detail, the history of the others. Take, for example, the Golden Wattle, *A. pycnantha*, as one of the best known. It is conceivable that in its bipinnate form as a full-grown tree it flourished in situations similar to those in which it is now found, less sheltered and less moist than the habitats of the decurrent group. In these more open but temperate parts it assumed its first modifications. Then occurred a new exodus. From these the seeds may have been carried farther inland to parts hotter and still less watered, and deposited there in the ejecta of birds. The undigested seeds, with softened integuments, readily germinated when soil and weather conditions favoured. The young plants were, however, soon in trouble through want of root moisture and rapid evaporation. The delicate leaves fell, but the stem, branches, and leaf-stalks, with their restricted transpiration surface, survived. Later came a new season of growth; the leaf-stalks felt their way with caution, broadening in the impulse and necessity for aerial feeding, the branches helped by projecting decurrent ridges—jury-masts rigged up by nature to weather the storm of circumstance. The device was a good one. Season by season it was elaborated. The embedded laminae rarely ventured out in the open, and when they did they failed, as before, to stand the test of intense heat and light. The substitute was more serviceable. As the phyllode extended and fought for breathing space it had to adapt itself to hard conditions. This it did by adopting an oblique droop, turning its edge to the sun. Other species overcame the trouble partly by this means and partly by developing a waxen bloom on the leaf surface—a sort of curtain against the sun: others by elongating the phyllodes in cylindrical and circular forms. The time came when the emigrant *pycnantha*, after many generations in Eremia, came back, per bird (or otherwise) to Euronotia, and found there the incentive to fuller growth.

Many of the species aspire even now, and have long been aspiring, to good form. They intend to have true leaves. The Golden Wattle, passing through many vicissitudes, has nearly reached its goal. It has almost a perfect lamina and petiole: it has a midrib already; it has lateral veins, and the sides of the blades are nearly equal. Its mountain relation, *A. penninervis*, follows closely in development, but its halves are not so equal. Both trees hang their leaves obliquely, thus

avoiding the glare that robbed their ancestors of their feathered foliage. Another example is seen in *A. leprosa*, which has only one main vein (or midrib) in the phyllode. It has thus, from the view of recognized true leaves, improved on its near relatives, *A. verniciflua* and *A. montana*, which have two veins. *A. stricta* has also achieved the distinction of phyllodia, with one main venule forming a distinct midrib, and has its secondary venules reticulated, thus having claims to admission to the high society of true leaves. It is a nice question, however, whether two midribs, or veins, or venules, or whatever they might be called, are not better than one.

Opposed to this theory, or at least inconsistent with it, is the peculiarity of such plants as *A. verticillata*, *A. diffusa*, and *A. juniperina*, particularly the former—a typical gully plant. *A. verticillata* (or "Prickly Moses," as it is commonly called—a corruption of Prickly Mimosa) produces the finest acicular phyllodes in whorls of five or six, and yet its common habitat is the most moist and sheltered. One would think it would constantly struggle for light and try for the greatest exposure of leaf. It makes one incline to the belief that the parts in which these plants now grow were once arid, and that they had retained the acquired characters when the conditions became entirely changed; but confronting that theory is the fact that the soft-foliaged bipinnate types grow in the same locality. When, however, we closely examine the whorled phyllodes, we find that they do not form a perfect whorl in that they are not set opposite, but one pair slightly above the other, and often one single phyllode, or perhaps a pair, in a slightly different position still. If we take *A. Baileyana*, the Cootamundra Wattle, a pinnate type, and strip the pinnae from the leaf-stalks, we find the latter situated in a corresponding position. A reduction of the total length of the stem would conceivably happen in such adverse circumstances as would bring about the disuse of the pinnae. This would bring the leaf-stalks in the quasi-whorled position of those in *A. verticillata*. Assuming, for illustrative purposes, that *A. verticillata* descended from *A. Baileyana*, we find the axillary position of the flower-stalk very similar in both, and it takes little imagination to see the racemose inflorescence of the Cootamundra varying to the catkin form in "Prickly Moses," side by side with the change from pinnae to acicular phyllodes. In cultivation the phyllodes of *A. verticillata* sometimes grow upwards in the form of the spokes of an inverted umbrella.

Acacias with very small or very narrow phyllodes are small or only moderate-sized shrubs. The pinnate-leaved forms are principally more or less arborescent. In dry, hot parts of Australia the surviving plants would not only reduce their

evaporating surface, but be reduced in size. The acicular and other small phylloded forms never produce pinnate leaves after the infantile stage, indicating a much longer period after the change than would be attributed to, for instance, *A. melanoxylon*. When the *A. verticillata*, *A. diffusa*, and *A. juniperina* types, after their sojourn in the wilderness, were brought back to the land flowing with water, they had neither physique nor size to support, and what they lacked in individual leaf surface was easily recompensed by increase in number of small surfaces. Coming into close bush association, they were more able to compete with encompassing growths than they would have been had they reverted to the pinnate type, or developed broad phyllodes, with the necessity of acquiring a new code of phyllotaxis or leaf adjustment. They could grow where they found a foothold, and knew little necessity for elbow-room.

The conclusions to which I am drawn are that we can claim to trace our many species of acacias in speculative fashion back to a common form, to *A. farnesiana* as the earliest known representative of the bipinnate acacias. That was probably preceded by a simple-leaved legume whose history is only to be learned from geology or embryology. A change of environment produced the phyllodinous type in numerous variations, now specific. Some of these, doubtless, by perfecting other and less plastic organs, have reached a finality of development, particularly those linear and spinescent types which have carried their desert forms back to moist regions. The broad phylloded types are in a present progressive stage, either fixing the new character or gradually adopting simple and entire leaves with an enclosed venation. There are intermediate phases suited to the general development of the plants which may be regarded as stationary, and in considering this subject it must be remembered that one of the principal uses of veins or nerves to the leaf is support. For leaves held in a vertical position or hanging obliquely, the longitudinal veining would give better service. Where leaves require a surface spread to the sun they need ribs like an umbrella. Most of the substitute leaves or phyllodes of acacias have adopted the oblique habit, and with it suitable vein support. In this change they have done away with the leaf-sleep or folding habit of mimosa.

Though the results of my investigation, both of materials and books, may be crude, it has given me much pleasure, and I am convinced that, as the potentiality of man is only limited by his ambition and desire, so is that of plants by their necessities. Every plant has embodied in it the elements of man's capacity to progress or regress, limited only to its needs as a plant. It is not a necessity of a plant to develop beauty

unless the beautiful feature will assist it to thrive. It is even doubtful if self-protection is the first law of nature ; rather the first law is to attack. Protection is never even suggested to an organism till an attack is made upon it. It does not even resist until it feels the necessity. If, from anything I have written, I seem to imply that individual plants are possessed of volition, I can only say that I adopt the idea, otherwise expressed, that all plants respond to stimuli which, when applied to more advanced forms of creation, are called promptings.

DIATOMACEOUS EARTH IN VICTORIA.—The Victorian Department of Mines has issued as Bulletin 26 a 16-page report on "The Occurrence of Diatomaceous Earth in Victoria," by Mr. D. J. Mahony, M.Sc., F.G.S., which contains references to about a dozen localities where diatomaceous earth has been found in varying quantities. The most important deposit, and the only one which has been worked to any extent, is that in the neighbourhood of Lillicur, about eight miles west of Talbot, which consists almost entirely of three species. From a microscopist's point of view the most noted was that recorded by the late Dr. Coates, so long ago as 1860, from the neighbourhood of the South Yarra railway bridge, in which he recorded some fifty species of diatoms. An almost similar deposit was described a few years ago by Mr. A. E. Kitson, F.G.S., as occurring near Punt-road, a little lower down the stream. This was revealed by the Yarra improvement works, but was too impure to be of any commercial value. Another deposit, which, however, is not mentioned in the Bulletin, was noted many years ago by the late Dr. T. S. Ralph and Mr. F. Barnard, when some drains were being cut for the purpose of draining the West Melbourne Swamp, but a list of the species found is not at the moment available. Recently a deposit was found at Fairfield when cutting a drain in Yarraford-avenue.

VICTORIA'S NUGGETS.—An attempt has been made in "Memoir No. 12 of the Geological Survey of Victoria" to list the gold nuggets found in Victoria since the discovery of gold in 1851. Twenty ounces is taken as the smallest size of a true nugget, and between that limit and the famous "Welcome Stranger" of 2,284 ozs., or nearly 1½ cwt., found at Moliagul in 1869, no less than 1,327 are listed. Doubtless, in the early days the finding of many nuggets, even of large size, was kept secret, so the list cannot be taken as complete. Victoria has proved the most prolific producer of nuggets in the world's history, and Mr. E. J. Dunn, F.G.S., the late director of the Survey, in his preface, says there is no reason why the list should not be augmented in course of time.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 9th December, 1912.

The President, Dr. J. A. Leach, occupied the chair, and about 40 members were present.

CORRESPONDENCE.

From Mr. J. W. Semmens, Chief Inspector of Fisheries and Game, intimating that during the year he had collected a quantity of information regarding the close season for quail, and conveying an invitation to the Club to appoint two representatives to a conference with him and delegates from Ornithologists' Union, Bird Observers' Club, Game Protection Society, and Gun Clubs' Association, on Monday, 16th December.

The President said the letter was important, and that Mr. Semmens desired to get the opening of the quail season fixed for a period of three years.

On the motion of Messrs. Barnard and Mattingley it was resolved that Mr. G. A. Keartland and the President represent the Club at the conference.

REPORTS.

A report of the excursion to the Badger Weir, Healesville, on Saturday, 23rd November, was read by Mr. F. G. A. Barnard on behalf of the leader, Mr. Reginald Kelly, who reported that only two members accompanied him. They had, however, spent an enjoyable and instructive outing, the forest foliage at the weir being well worth the walk. Among the many flowering plants and shrubs met with the straggling, semi-climbing *Bossiaea cordigera*, bearing fairly large papilionaceous flowers, was deserving of special mention. Everywhere the beautiful Fringed Lily, *Thysanotus tuberosus*, was displaying its purple flowers, while the bright blue flowers of the Blue Pincushion, *Brunonia australis*, were equally conspicuous. On a tree-fern near the weir the little orchid, *Cyrtostylis reniformis*, was growing very freely, but its flowering season was just over.

Miss F. Bage, M.Sc., reported that the junior excursion to Black Rock, on Saturday, 7th December, had to be abandoned owing to inclement weather.

GENERAL BUSINESS.

Mr. P. R. H. St. John read an extract from the *Irgus* of 25th October respecting the disposal in Europe of large numbers of

Emu skins and Lyre-birds' tails, and asked if the Club was prepared to take any action.

The President said he believed the Prime Minister was making inquiries into the export of the skins and feathers referred to. Prosecutions would follow on the detection of the offenders.

On the motion of Messrs. Gates and St. John it was resolved "that the attention of the Customs Department be drawn to the extract, and it be urged to take steps to prevent the traffic in skins and feathers of native birds."

Mr. G. Coghill read a letter from Mr. Fred Parsons, Lara, wherein he urged the Club to use its influence to have the You Yangs Reserve and the adjoining State Forest proclaimed a sanctuary for birds.

Speaking in support of the suggestion, Mr. Coghill pointed out the advisability of soliciting the co-operation of the Geelong Field Naturalists' Club if the authorities were to be approached on the matter.

Dr. T. S. Hall, M.A., said he would like to see the place reserved as a sanctuary, and moved "that an attempt be made to have the State Forest at the You Yangs reserved for bird life, and that the Geelong Field Naturalists' Club be asked to co-operate."

The motion was seconded by Mr. F. G. A. Barnard, and carried unanimously.

PAPERS READ.

1. By Mr. F. Chapman, A.L.S., entitled "Notes on Tracks made by a Common Gasteropod, *Bittium cerithium*."

The author stated that during a brief stay at Port Fairy in November, 1912, a stretch of muddy sand, left bare by the retreating tide, had been found by himself and Mr. C. J. Gabriel to be covered with a network of shallow grooves. These on investigation were proved to have been made by a small mollusc, *Bittium cerithium*, hundreds of which were noted at work. He instanced this occurrence as probably throwing some light on markings found in Palaeozoic rocks in different countries, and some of which have been described by geologists as organic remains.

Mr. C. J. Gabriel said the author had brought forward a very interesting question. It was wonderful to see the tracks made by the little Gasteropods, and that somewhat similar tracks could be seen on the beach at Port Melbourne made by other species of molluscs.

2. By Messrs. F. G. A. Barnard and C. French, jun., entitled "Notes of a Visit to Mount Piper, near Broadford."

The authors briefly recorded some of the more interesting plants and insects met with during a visit to Mount Piper, an

isolated hill between Kilmore and Broadford. Within the railway enclosure near Kilmore East they met with large numbers of a little hooded orchid, *Pterostylis cyanocephala*, Fitzgerald, which, however, is probably only a variety of *P. mutica*.

3. By Mr. J. W. Audas, F.L.S., entitled "One of Nature's Wonderlands—the Victorian Grampians."

The author, in a most interesting and instructive paper, detailed the various trips he had made, both to well-known places and to others seldom visited, during a ten-days' stay in the Grampians, mentioning the principal flowers and shrubs to be found in each locality, and drawing particular attention to the magnificent scenery of these, to a certain extent, unknown mountains.

Mr. G. Coghill complimented the author on the graphic nature of his paper, and said the Grampians are all Mr. Audas had represented.

Mr. F. Pitcher said that though several papers dealing with the Grampians had been read before the Club, no one had given a better description of the mountains and their wonderful flora. He had visited the mountains just after Mr. Audas, but unfortunately bad weather had prevented him from seeing many of the beauty spots.

Mr. W. F. Gates suggested that the committee should consider the advisability of a "camp-out" at the Grampians when framing the next excursion list.

Mr. A. H. E. Mattingley agreed with the author as to the desirability of substituting more euphonious names for such places known as "The Devil's Gap" and "Hell's Gates."

The chairman congratulated the author on the interesting way in which he had described the Grampians, and expressed his belief that they quite equalled the Blue Mountains of New South Wales, both in scenery and vegetation.

NATURAL HISTORY NOTES.

Mr. P. R. H. St. John said that whilst journeying along Lyell's Creek, near Bacchus Marsh, on 7th December, he noticed a large number of nests of the Fairy Martin situated beneath a ledge of rock in a cliff-face beside the stream. Investigation proved the greater proportion of the nests to contain sparrows' eggs or young birds. It would be interesting to know if the sparrows threw out the Martins' eggs or young when taking possession of the nests. He asked if any member of the Club had noted the use of swallows' nests by sparrows.

Mr. C. French mentioned having observed a similar condition of things in another locality.

The President observed that records were not wanting in

support of the fact that the introduced birds, particularly starlings, dispossessed the native ones of the nesting places they had selected.

In a further note Mr. St. John mentioned having seen large numbers of White-browed Wood-Swallows passing over South Yarra early on the morning of the 14th October, 1912. The birds were travelling due north, at no great elevation, and against a strong breeze. They continued to pass rapidly in flocks of fifty or more during the half-hour we had them under observation.

Mr. C. J. Gabriel mentioned having noted at the Mutton-bird rookery, Port Fairy, as many as fifteen and twenty dead birds at the entrances to the burrows. In his opinion dogs were responsible for this wholesale destruction.

Mr. A. H. E. Mattingley concurred with this view, and cited an instance in support.

The President considered some steps should be taken to prevent further depredations by dogs, as the rookery at Port Fairy was the only one on the mainland.

Mr. J. W. Audas, F.L.S., stated that during a brief visit to South Gippsland, in November last, he had noted the little green lamellicorn beetle, *Diphucephala colaspoidoides*, Gyll., known as the Cherry-tree Beetle, in such numbers on the native shrubs, *Leptospermum scoparium* and *Cassinia aculeata*, that they soon gave either shrub the appearance of having been scorched by fire.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Dried specimens of the following plants, collected on the Grampians, September, 1912, in illustration of his paper:—*Bauera sessiliflora*, F. v. M., Showy Bauera; *Boronia pilosa*, Labill., Hairy Boronia; *B. pinnata*, Sm., Pinnate Boronia; *Brachyloma ericoides*, Sonder., Broom Heath; *Conospermum Mitchellii*, Meiss., Mitchell Conospermum; *Correa Lawrenciana*, Hook., Mountain Correa; *Eucalyptus alpina*, Lindl., Grampians Gum; *Grevillea oleoides*, Sieb., Olive Grevillea; *Helichrysum Blandowskianum*, Steetz., Woolly Everlasting; *Hovea longifolia*, Robt. Br., Long-leaved Hovea; *Leptomeria aphylla*, R. Br., Small-leaved Sour-bush; *Leucopogon glacialis*, Lindl., Twisted-leaved Heath; *L. thymifolius*, Lindl., Thyme-leaved Heath; *Phebalium bilobum*, Sm., Truncate Phebalium; *Prostanthera debiles*, F. v. M., Weak-leaved Mint Bush; *P. denticulata*, R. Br., Wart-leaved Mint Bush; *Thrymalium Daltoni*, F. v. M., Grampian Thrymalium; *Thryptomene Mitchelliana*, F. v. M., Bushy Heath Myrtle; *Pseudanthus ovalifolius*, Oval Pseudanthus; *Pullenaea rosea*, F. v. M., Rosy Bush Pea; *Cladonia retipora*, K. (Lichen); sandstone

showing coloration and very minute layers of strata ; Dendrites ; eighteen scenic views of the Grampians ; map showing distribution of notable species of Grampian plants

By Mr. F. G. A. Barnard.—Dried specimens of *Pterostylis mutica*, var. *cyancephala*, Fitz., from Broadford district.

By Mr. F. Chapman, A.L.S.—Natural size drawing of track made by *Bittium cerithium*, Q. & G., sp., between tides, Marine Lagoon, Port Fairy, November, 1912.

By Mr. C. French, jun.—Double stick case of "Saunders Case Moth," *Oiketicus elongatus*, collected at Canterbury by Master Claude French, December, 1912 ; scale, *Lecanium nigrum*, var. *depressum*, on *Daphne* growing at Canterbury.

By Mr. J. Gabriel—*Prasophyllum patens*, R. Br., Pale Leek Orchid.

By Mr. C. J. Gabriel.—In illustration of Mr. Chapman's paper, *Bittium cerithium*, Quoy and Gaimard, sp., with other representatives of the genus ; also other molluscs which leave distinct tracts on sand at low water.

By Mr. W. Roger.—Leaf insect from Ceylon.

By Dr. C. S. Sutton.—*Xylocarpon* and *Plesiocapparis*, fossil fruits from "leads" in tin drift, resting on granite, Mt. Killiecrankie, Flinders Island.

By Messrs. P. R. H. St. John and J. G. O'Donoghue.—*Augomela*, sp., found in abundance on *Dodonaea viscosa*, Lerderberg River ; specimens in flower and fruit of *Beyeria opaca*, F. v. M., small Wallaby Bush ; *Callitris glauca*, R. Br., 1825, White or Cypress Pine (not previously recorded for Victoria), found also in New South Wales, South and Western Australia, collected by exhibitors at Lyell's Creek, Bacchus Marsh district, 7th December, 1912.

"THE COUNTRY-SIDE."—The December number of this magazine, which is the successor of the old *Science Gossip*, so dear to all dabblers in natural history, is to hand, and contains the usual varied assortment of natural history matter. The feature of recent numbers is the coloured plate presented monthly. This month the plate is entitled "Early Breakfast," and is a beautiful reproduction of a Whitethroat feeding three young birds huddled together on a briar bough. It is termed a bromochrome, and certainly Mr. J. Evans, the artist, is to be congratulated on the result of his effort. Mr. H. H. Scott, of the Launceston Museum, contributes an article on "Extinct Tasmanian Monsters," while Mr. C. Grant Lane, whose photographs occasionally appeared in the *Leader*, contributes an illustrated article on "Wild-Folk in a Gippsland Forest," dealing with the Silver-grey Opossum—or rather 'Possum, to distinguish it from the original opossum of America.

FURTHER NOTES ON THE BRISBANE RANGE.

BY J. G. O'DONOGHUE AND P. R. H. ST. JOHN.

(Read before the Field Naturalists' Club of Victoria, 11th Nov., 1912.)

NEARLY two years ago we had the pleasure of reading before this Club a paper (*Vict. Nat.*, vol. xxvi., p. 151) descriptive of the birds and plants met with during a three days' tramp through the Brisbane Range in October, 1909. Our remarks on that occasion seem to have aroused some interest in this little-known locality, and led to two members visiting the northern end of the range, near Rowsley, in September, 1911, for the purpose of collecting wild-flowers for the annual Club exhibition. Since then we have made several visits to the district, and from the results venture to hope that this paper on the bird and plant life of a locality comparatively unknown to members of the Club will also prove interesting.

Apart from the object of collecting data to compile a census of the flora of the range for the guidance and information of Club members botanically inclined, the primary motive in selecting Lara rather than Rowsley—the nearest railway station to the range—as our starting-point on the morning of the 16th September, 1911, was to examine a eucalypt growing on the right bank of Sutherland's Creek, near the township of Maude. During Easter week prior to this trip the tree was noted and seen to be possessed of characteristics that differentiated it from any of the known species recorded for Victoria. Lethbridge, on the Geelong-Ballarat line, would certainly have been nearer our objective than Lara, but, as we purposed examining several trees of *Eucalyptus viminalis*, var. *pluriflora*—then not recorded as occurring in Victoria—growing on the banks of the Moorabool, and a thicket of *Melaleuca Preissiana* in the neighbourhood of Maude bridge, we did not favour the idea of retracing our steps, a procedure which this route, if selected, would have necessitated. Furthermore, the route from Lethbridge was known to possess little of interest, while that from Lara, though the longer of the two, was strange, and possibly might furnish something uncommon.

Quitting Lara promptly after the departure of the 6.30 a.m. Geelong train on the date specified, we set out at a brisk pace along a metalled road trending in a westerly direction. The morning, though somewhat keen, was calm and clear, and favoured a wide range of view over the surrounding basalt country, which was then assuming the mantle of spring. On our right the You Yangs bulked largely. In the rays of the morning sun their granite bosses and seeming arid slopes stood out prominently, and in striking contrast to the green plains by which they were surrounded. On gaining the Ripley-

Parwan road we followed its course in a northerly direction for a short distance and then bore westerly along a thoroughfare thickly overgrown with the Shore Thistle, *Carduus pycnocephalus*, and evidencing signs of little usage. Ascending a slight eminence, the plains again unfolded to view, and stretched away in monotonous sameness as far as the eye could range in front and to the right and left. Here and there on their comparatively level expanse sheets of water existed, whereon, or by the margins thereof, the Maned Goose, Black and Mountain Duck, Marsh Tern, and White-fronted Heron and Cormorant were often noted. In a plantation formed for the purpose of a breakwind and as a shelter for stock, numerous specimens of *Acacia pycnantha* were found, possessing phyllodes of exceptionally large dimensions. The most common of the plants occurring among the acacias were *Velleya paradoxa*, *Isoetopsis graminifolia*, and *Agrostis venusta*. A large area of the plain hereabouts was being ploughed for the first time. Hundreds of Magpies had been attracted to the scene of operations in quest of the grubs, worms, crickets, and other creatures the discs revealed. Scores of hungry birds closely attended the ploughs, whilst scores of surfeited ones lined an adjacent fence and caroled softly, or viewed their foraging comrades with that equanimity that only a sufficiency of "grub" can occasion.

Upon reaching the Anakie-Staughton Vale road we followed its course northerly for about half a mile, and then bore westerly again across country. We had not proceeded far when we found ourselves in difficulties. The green sward that looked so inviting from a distance proved to be a veritable marsh. The Plain Plover scolded us from aloft, and from all points of the compass innumerable frogs plagued our ears with an incessant chorus, and White-fronted Herons fled or flew from us with hoarse cries of alarm. Directing our course towards a belt of timber that indicated the presence of a formation other than basalt on the plain, we hastened on over the sodden ground, and eventually found ourselves on dry granitic soil. We had left the daisies, *Brachycome cardiocarpa* and *radicans*, and other marsh-loving plants, behind us, and here was *Microseris Forsterii* and *Drosera Menziesii* to welcome our first steps on their habitat. Here and there weathered bosses of granite protruded from the grassy soil, that at a little distance might be mistaken by one unacquainted with the locality for heaps of earth thrown up from a number of excavations. The timber growing on the granitic area was *Eucalyptus leucoxylon* and *Eucalyptus viminalis*. The former was in flower, as is usual in this neighbourhood every month of the year, and from every tree came the calls of the Noisy Miner, the Red Wattle-bird, and the Rosehill Parrakeet. *Astroloma humifusum*, var. *denticulatum*,

was fairly common, and the Blue Squill, *Chamæscilla corymbosa*, was occasionally met with.

Reaching the Anakie Creek, we found it deeply entrenched between banks of sandy loam, evidently derived from the disintegration of the granite. The creek carried a fair volume of water, and where we effected a crossing furnished an interesting illustration of stream meander. From the proximity of the volcanic rock to the granite, it would seem that when invested by the molten lava the latter formed an island of not inconsiderable dimensions amid the flow, and that subsequently, owing to its greater susceptibility to external agents and chemical changes operating through a long period of time, it had become, as we then beheld it, level with the basalt at some parts, and much below it at others. Standing out in bold relief directly in our course was a bare basaltic ridge that defined the eastern limit of the Brisbane Range, and that could be traced for miles to the northward till it junctioned with the timber-clad Ordovician in the neighbourhood of Anakie. On gaining the crest of this ridge we pushed on till the valley of the Sutherland's Creek unfolded to our expectant gaze. Three hundred feet, or thereabouts, beneath us the stream meandered, its banks margined in places by the *Leptospermum lanigerum* and the *Eucalypts rostrata* and *leucoxylon*. Several farm-houses occurred on the opposite slope, and on its crest, as if delineating the position of the Maude Miocene beds, a belt of eucalypts existed—mostly *E. viminalis*—and extended to the valley of the Moorabool. Then the basalt again prevailed, and stretched in dreary prospect to the Woodburne Creek, at Bamgannie. Descending to the creek, we continued up its course till the objective of our journey thither was reached. The tree, which belongs to the smooth-barked section of the eucalypts, is a comparatively young one, not being more than 20 feet in height, and possesses a diameter of six inches or thereabouts. Unfortunately, no flowers or buds were to be obtained, but specimens of the leaves and fruit were gathered and submitted to Mr. Maiden, who characterized it as "an interesting form of eucalypt." It is undoubtedly an undescribed species, and we trust to be in a position to furnish the Club with a more detailed description of the tree in the near future. *Eucalyptus camphora* and *E. rostrata* occur in the immediate vicinity of this tree, and, some little distance up stream, *E. leucoxylon*. A lengthy search on this occasion, and another about three months later, failed to reveal another specimen.

So much time was occupied in our quest that, after partaking of a hurried lunch, we found it would be necessary to abandon our intention of visiting the Moorabool valley if we wished to

pass through the township of Steiglitz before darkness ensued. Heading up the stream, we found its course defined by a blaze of yellow. The introduced Gorse, *Ulex Europaeus*, and the Canary Island Broom, *Cytisus canariensis*, had firmly established themselves beside the water's margin, and were in full bloom. They, however, appeared very commonplace when contrasted with *Acacias pycnantha*, *verticillata*, *decalbata*, and *armata*, then at the point of perfection. Here and there, on the left bank of the creek, the vertical sedimentary rocks formed abrupt faces. In such spots the Purple Coral-pea, *Hardenbergia monophylla*, and the smaller clematis, *Clematis microphylla*, displayed their beauty, and *Cassinia arcuata* and *Indigofera australis* eked out a precarious existence. The right bank of the stream is, for the most part, elevated but little above the water's edge. The ground is fertile, and gradually slopes upwards to the level, timbered area intervening between the creek and the broad valley of the Moorabool. The formation of the area mentioned is Eocene, and on the slope, either to the creek or to the river, numerous pieces of polyzoal limestone, derived from outcropping beds of this rock, may be picked up. Repeated instances came under our notice hereabouts of the prevalence of the larvae of the Gum-tree Saw-fly on the eucalypts. One small, slender sapling of *E. rostrata* actually drooped beneath the burden of five large masses of these loathsome creatures. They would appear to be immune from the attack of birds, since they existed at a regular rendezvous of the feathered tribe.

Abandoning the course of the creek, where it trended in a wide sweep to the east, we bore northerly along a small valley leading to the Maude-Steiglitz road. The valley was carpeted in places with the white flowers of the *Claytonia australasica*, and in others with the yellow, star-like flowers of the *Hypoxis hygrometrica*. At its head *E. sideroxylon*, *E. camphora*, and *E. macrorhyncha* grew thickly amid a dense and far-reaching growth of common Bracken Fern, *Pteris aquilina*. Shortly after reaching the roadway we were forced to shelter from a heavy fall of rain. As there were no indications of the rain abating after the lapse of a quarter of an hour, we donned our water-proofs and pushed on towards Steiglitz. At the bridge spanning the Sutherland's Creek we collected *Pultenaea daphnoides*—a perfect specimen of the plant—and *Pomaderris ferruginea*, the latter being previously recorded only from the east. Beside the creek *E. melliodora* was flowering, and among its blossom the Musk and Purple-crowned Lorikeets were busily foraging in large and noisy companies. A little distance from the bridge *Olearia pannosa* was met with displaying its large, star-like, solitary, white-rayed flower-heads amid a growth of young gums. The situations in which we usually met the plant were

arid in the extreme, the Palaeozoic rock, associated with quartz, showing on the surface. Previously, the nearest known locality to Melbourne in which this beautiful composite occurred was Anglesey. Locally it is known as the "Mountain Daisy." This much we gleaned from a youth who came galloping down a slope through the young wattles and gums, reined up in evident wonder beside us, shouted the information sought, and, flogging his mount into a gallop with an old hat, disappeared in quest of several stray horses, which we subsequently encountered feeding by the roadside. *Acacia pycnantha* abounded hereabouts, and formed dense thickets that only a wallaby and the youth we accosted could negotiate with any despatch. The whole was a mass of bloom, and the perfume therefrom in the still, moist evening appeared to us singularly oppressive. About three months later, when one of us passed along the road, the trees were rendered unsightly by the possession of thousands of twisted legumes. The seeds had been shed, and were then in the process of collection by small reddish-coloured ants, which had, in many instances, gathered as much as a dessert-spoonful of seed about the entrance to their nest. The object of this acquisitiveness was not apparent, since any particular seed in the various collections was many times larger than the entrance to the nest. A casual examination of the seeds seemed to warrant the conclusion that the caruncle was consumed by the ants. To this harvest, so bountifully spread by the *Acacia pycnantha* and *A. Mitchellii*, the Bronze-winged Pigeons had come. The birds were very numerous and extremely shy, taking wing at the slightest disturbance. Proceeding onward, we found the transition from clay-slate to a somewhat arenaceous formation ushered in new types of vegetation. The white and pink Epacris, *Lencopogon glacialis*, *Grevillea floribunda*, *Tetratheca ciliata*, and *Correa speciosa* margined the roadway. Between the grass-trees a small form of *Banksia marginata*, and sturdy specimens of *Hakea acicularis*, occurred. *Isopogon cerasophyllum* and *Platylobium obtusangulum* abounded, as did the orchid *Glossodia major* and *Acacia Mitchellii*. Shortly after passing Steiglitz cemetery the clay-slate again manifested itself. *Eucalyptus hemiphloia* and *E. Sturtiana* gave place to the eucalypts *macrorhyncha*, *polyanthemus*, *melliodora*, and *obliqua*, and the Epacridæ order was succeeded by the Cyperaceæ. Through dense growths of the Black Saw-sedge, *Gahnia radula*, *Comesperma volubile* struggled for espial and *Spyridium parvifolium* reared a modest spray of sickly leaves.

The township of Steiglitz, situated on a steep slope leading to the Sutherland's Creek, was reached in due course. Its deserted streets and dilapidated habitations plainly evidenced

how Fortune has finally dealt with this one-time flourishing mining centre. In the heyday of its existence it was the hub, as it were, of Tea-tree, Eclipse, Stony Rises, Dolly's Creek, Morrisons, and other diggings, spread over an area of 70 square miles of country. To-day its habitable houses might be numbered on one's fingers. Piles of rock, and aged fruit trees that occur along miles of road, mark the site of former habitations, whilst large mounds of slate and massive brick smoke-stacks amid the renascent vegetation proclaim the spots where fortunes were lost or won. Traversing the main street of this relic of former opulence, we crossed the creek, and, after negotiating a long and somewhat steep slope, found ourselves on the crest of a spur, along which we continued towards the Geelong Reservoir. Before we could reach a predetermined camping-place night overtook us. Selecting the most favourable camp that presented itself we built a fire and made ourselves as comfortable as circumstances permitted. At 3 a.m. we were astir, and half an hour later were sauntering towards the reservoir, a more rapid pace being rendered impracticable by reason of a dense fog that had settled over the neighbourhood shortly after midnight. The road ramified at places, and had a habit of disappearing altogether at others, so that at times our exact whereabouts was often a matter of conjecture. The Bittern's booming note at length made known our proximity to an extensive swamp overgrown with the Tall Spike-rush, *Heliocharis sphacelata*. Though both are familiar with the Bittern's note, the volume of this bird's call far exceeded anything we had previously heard. The Noisy Miners were greeting the grey dawn with their ringing chorus when the hazy outline of the reservoir unfolded to view on our right. The loud call of the Black Duck came from all parts of the reservoir, and occasionally small flocks could be dimly seen on the mist-wreathed water.

Proceeding along the Beremboke road for about a mile beyond the reservoir, we halted for an hour beside a swamp where water-fowl of many varieties were observed, and also a pair of Harriers, whose evolutions over the dense growth of spike-rush in the swamp oftentimes claimed our attention. These birds nest hereabouts. Within two chains of the spot where we rested two young birds were taken by one of us from a nest about four years previously, and lived in captivity until very recently. From the remains scattered about the nest, "bunny" had been heavily levied upon to furnish the larder.

The mist was rapidly dissipating before the sun's rays as we resumed our journey. The long Kangaroo-grass within the reserve was laden with moisture, and made progress somewhat

unpleasant. Conditions were eminently favourable to the growth of orchids, for in a short distance *Pterostylis nutans*, *P. nana*, *P. curta*, *P. vittata*, and *P. longifolia*, *Glossodia major*, *Corysanthes pruinosa*, *Acianthus exsertus*, and *Caladenia deformis* were gathered. The beautiful blue flowers of the last-mentioned were exceptionally fine. Sturdy specimens of *Acacia melanoxylon* abounded, and, being in full bloom, rendered the air in their neighbourhood redolent of perfume.

Emerging from a "ringed" area of forest land, we found ourselves on a bold basaltic ridge that terminated abruptly in the angle formed by the junction of the Little River and Reilly's Creek. The lava appeared to have infilled an old valley in the plateau, and to have become, by the removal of the sedimentary rock on either side, a long ridge little inferior in elevation to the much older encompassing formation. The ridge was destitute of timber, but nourished a thick sward of short, green grass. The view to the right and left was circumscribed, but directly in front, through a gap in the contour of the range, the You Yangs showed up plainly, and beyond them the waters of the bay. *Casuarina suberosa* occurred near the ridge.

Near the junction of the two streams previously referred to several large trees of *E. leucoxylon* were in full blossom. In the spreading heads Pennant's Parrakeet, the Roselill Parrakeet, and the Musk Lorikeet were foraging, the ground beneath the trees being littered with fallen blossoms. Large companies of the White-winged Chough abounded, their soft, whistling call being heard on all sides. The Spotted Pardalote was also plentiful. Most of these birds were engaged tunnelling under the litter of decaying leaves and twigs that strewed the slope to the river. Crossing the Little River, we gradually worked our way to the crest of a spur, along which we journeyed in a north-easterly direction. *Encalyptus ribida* and *E. paludosa* were noted hereabouts. In our many descents from the crests of various ridges we made the acquaintance of several small and delightful valleys. One in particular, thickly carpeted with tufted Meadow-grass, *Poa cæspitosa*, and margined by a wilderness of Golden Wattles, all in the height of flowering splendour, appeared to be the home of honey-eaters. But in this veritable Eden all seemed to have some mutual difference to adjust. A dozen White-plumed Honey-eaters might be seen indulging in a rough-and-tumble on the grassy sward a few yards away. A nearly equal number of New Hollands fought like demons amid a bunch of granite fern. A large troupe of Spinebills indulged in a running fight amid the wattle, and on several occasions pugnacious birds, devoid for the time being of fear of man, fought within hand-grasp. The

White eared Honey-eaters adjusted their grievances, for the most part, amid the timber, as did the Red and Brush Wattlebird, the latter being unusually vociferous. We ascended by easy stages from this valley to the crest of the spur that led to the Rowsley-Beremboke road. Here, among numerous flowering plants, we noted *Billardiera cymosa*, *Pultenaea humilis*, *Personia chamæpence*, and *Tetratheca cricifolia*.

Prior to quitting the range for the plain, we descended into a triangular-shaped depression with extremely steep slopes. The small area of comparatively level ground these slopes encompassed was overgrown with *Pultenaea daphnoides*. Some of the plants were over eight feet in height, and were in profuse bloom. Many of them were invested with the twining *Comesperma volubile*, which had in many instances bound numbers of plants together in a bewildering floral interlacement. A stiff climb and an equally steep descent brought our ramble on the range to a close.

We had not left the wooded slopes far behind us when *Bossiaea microphylla*, a new record for the south of Victoria, was noted on the plain. Evidence was not lacking that it was at one time associated with the Grass-tree, *Xanthorrhæa australis*, and had, in the struggle for existence, by reason of its spines, survived the attentions of depasturing stock, which, undoubtedly, had proved fatal to its more sturdy associate. The occurrence of *Bossiaea microphylla*, associated with the remains of the Grass-tree, on the plain and at a part of the range characterized by its height and steep slopes, may be of little import. To what cause or combination of causes it owed its presence we are unable to affirm. Without any research on the subject one might hazard the opinion that, as the eastern limit of the range—or, more strictly speaking, the Ballarat plateau—is terminated by a normal or gravity fault, we have in this small leguminous plant the sole survivor of the varied vegetation that undoubtedly graced the down-throw side of the Rowsley fault.

In our journey to the Parwan railway station we noted *Casuarina Luchmannii*, which had not been previously recorded nearer than the South Australian border.

Accompanied by Dr. H. Green, of the Melbourne University, we visited the range on the 31st August last, and spent the greater part of two days thereon. The least common flowering plants noted on this trip were *Dillwynia cricifolia*, var. *normalis*, *Grevillea lanigera*, and *Olearia argophyllus*. *Boronia anemonifolia* occurred abundantly in places, associated with *Prostanthera rotundifolia*, while *Leucopogon juniperinus*, previously recorded only from the north-east, was also met with. Of the eucalypts, *E. dives*, *E. capitellata*, and *E. viminalis*, var.

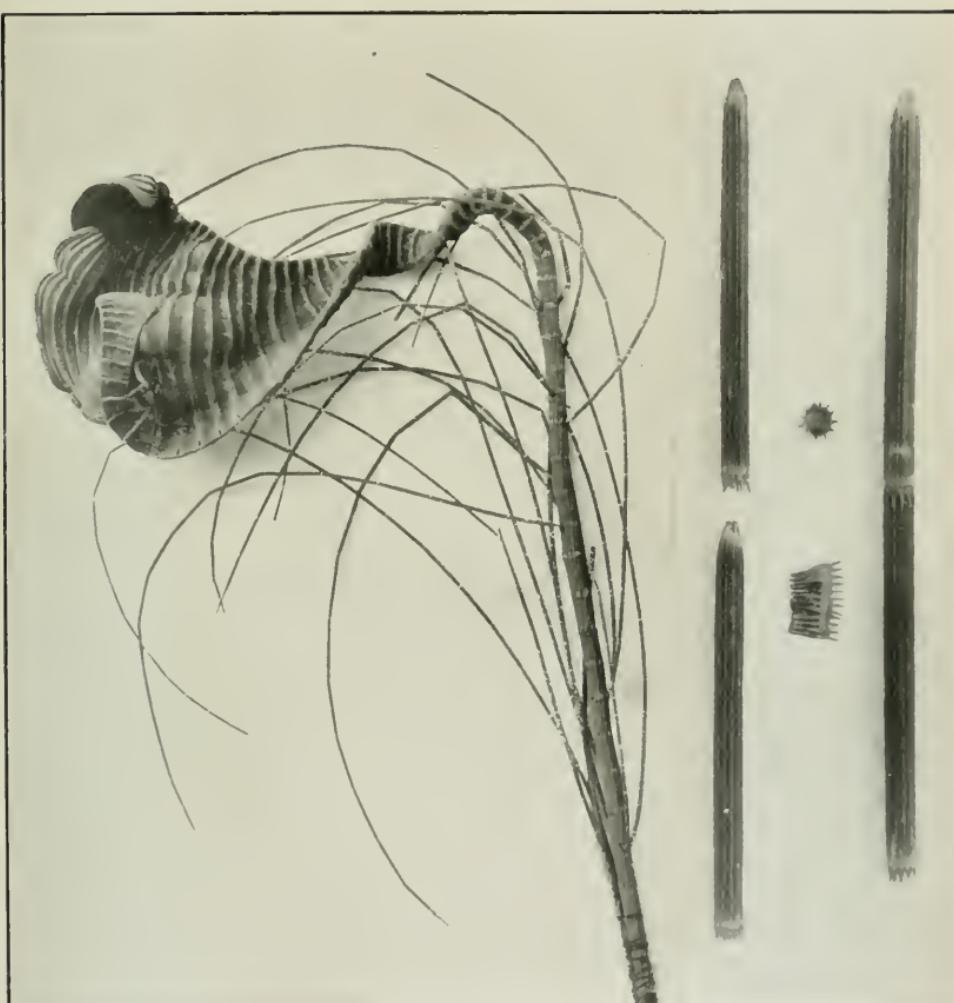
pluriflora, were the least met with. A comparatively small tree of *E. sideroxylon* was often noted, bearing large pink flowers. On this occasion we visited and photographed an old nesting-mound of the Mallee-hen.

So far we have noted 104 species of birds on the range and 358 species of plants.

FASCIATION IN A CASUARINA.—An example of fasciation in the stem of a young Casuarina was exhibited at the October meeting of the Club, and, the occurrence being somewhat unique in a hard-wooded plant, the accompanying plate is published as a permanent record of the fact. The specimen was taken from a young tree about eight feet in height found growing near Casterton, Victoria, by Mrs. Z. Y. Neall, who forwarded it to Mr. J. Cronin, Curator of the Melbourne Botanic Gardens, to whom we are indebted for permission to figure it. It has been identified as *Casuarina stricta*, Aiton, the Coast or Drooping Sheoak, indigenous to Victoria, New South Wales, South Australia, and Tasmania. Fasciation, which, according to Kerner ("Natural History of Plants"), is due to gall-mites, occurs most frequently in soft-wooded plants of rapid growth, the stems becoming flattened instead of retaining a cylindrical shape, and may be seen in foxgloves, roses, &c., but is considered rare in hard-wooded and Australian plants. On the right are figured portions of the branchlets, showing one in section, also a detached whorl of scales, which in this tree represent the leaves.

TOURIST MAP.—A new edition of the Healesville-Marysville Tourist Map was issued just before Christmas, and in many ways is an improvement on the former issue, though there is still much to be desired in the way of indicating the altitudes of the different portions of the district. Looking at the map one would expect to find the country almost flat, with here and there a ridge, consequently the map must be very misleading to anyone who goes into the district for the first time. True, several heights have been added, and by a process of calculation differences in altitude can be worked out, but to be of use as a "tourist" map more detail should be given. The present map takes in more of the Marysville country than the former, and tracks to the various beauty spots are indicated. In a future edition the position of the O'Shannassy aqueduct might be added. The position of Ben Cairn is altered, but still seems too far west of the Dee. It would be much better to issue smaller maps for each centre rather than one large map covering about 800 square miles of country.

PLATE VIII.



FASCIATION IN A CASUARINA

NOTE ON TRACKS MADE BY A COMMON GASTEROPOD,
BITTIUM CERITHIUM, Q. AND G., SP.

BY FREDERICK CHAPMAN, A.L.S.

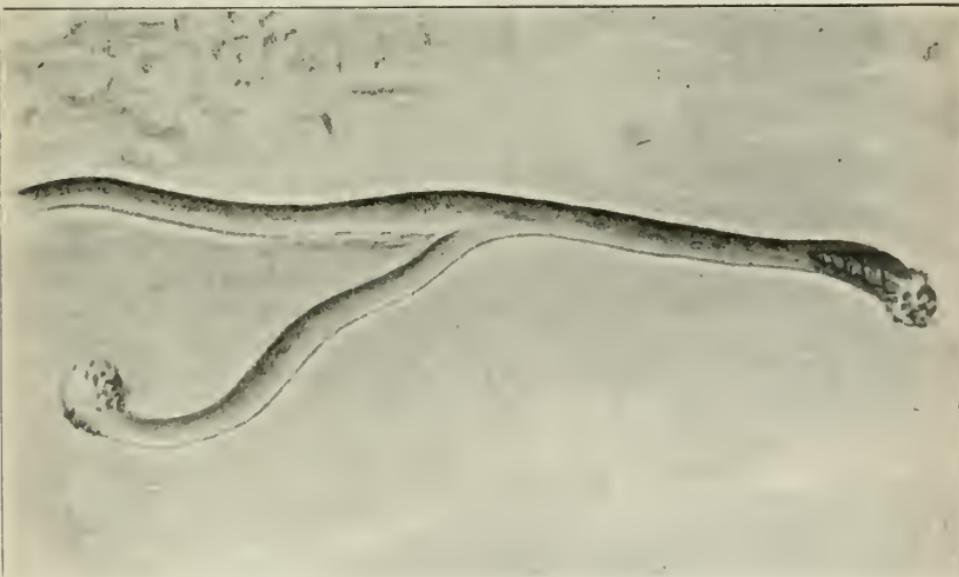
(With Text Figure.)

(Read before the Field Naturalists' Club of Victoria, 9th Dec., 1912.)

It frequently falls to the lot of the palæontologist to deal with extremely meagre evidence as to the existence of former life, especially in the more ancient sedimentary rocks. Amongst the most problematic of these pieces of evidence may be mentioned the tracts and trails of organisms moving over the wet sand and mud of those far off times. Their tracts would, in the course of events, be covered up and preserved to us under a thin layer of sand or silt laid down by the next incoming tide; whilst the creatures themselves would probably share a summary fate by being washed back into pools to form food for the larger animals waiting to seize them.

Any present day facts, therefore, bearing on these problematic occurrences, which might throw light on the authors of these cryptic writings on stone should be welcomed. Hence the present note.

During a short stay at Port Fairy (November, 1912), in company with Mr. C. J. Gabriel, we noticed in searching the lagoon to the east of the township, a stretch of muddy sand

TRACK MADE BY *BITTIUM CERITHIUM*, Q. & G., SP.

Between Tides, Marine Lagoon, Port Fairy, Nov., 1912. Nat. size.

left in a moist condition by the retreating tide which had evidently ebbed away a few hours before. The patch under observation measured about 20 yards by 1 yard, and was covered with a network of shallow grooves about 3 mm. in diameter, and about 1.5 mm. deep in the centre. There were many other patches of a like nature in the surrounding area. At the terminus of each long trail, and partly ensconced under a little tumulus of sand, lay a living *Bittium cerithium*. The mollusc in each case was slowly working its way along as it fed on the organic particles, amongst which, no doubt, foraminifera were included, for they were common in the sand. In its progression the mollusc tumbled the damp sand to each side, the result of which was to form a fairly smooth groove, the edges of which were raised slightly above the general surface of the sand. From our observations at this spot it is probable that there were many hundreds of these little Gasteropods at work, some of whose silent testimony of conditions in the human period of the twentieth century may eventually be handed down to a future school of geologists.

In Palaeozoic rocks similar tracks are not uncommon, and when these are filled with a cast of mud the latter are often erroneously referred to as sea-weeds or fucoids. In the Hudson River group (Upper Ordovician) of North America, from Washington Co., Dr. J. Hall figured some trails under the generic name of *Gordia*. These represent casts of slight depressions of a meandering character, distributed over the surface of slabs of shale, which that author compared with the tracks "made by *Melania* and other aquatic and marine shells of the present day."* The *Paleochorda minor* and *P. major*, McCoy,† of the Skiddaw slate, England, were probably due to the same cause—that is, by the passage of Gasteropods over the wet sand. These are referred by McCoy to plant remains.

The above are a few of many instances where similar trails have been referred, sometimes to animal life, at others to plant life. It is, therefore, a subject worthy of more detailed study than has yet been given to it, and by gathering similar facts we may draw therefrom more certain inferences as to the nature of many hitherto puzzling organic remains.

CORRECTION.—The number of the volume on the cover of the December *Naturalist* was printed XXX. instead of XXIX. Will readers kindly make the necessary correction?

* Pal. New York, vol. i., 1847, p. 264, pl. Ixxi., figs. 1, 2.

† Brit. Pal. Foss., pl. 1A, figs. 1-3.

The Victorian Naturalist.

VOL. XXIX.—No. 10. FEBRUARY 6, 1913.

No. 350.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 20th January, 1913.

The president, Dr. J. A. Leach, occupied the chair, and about 80 members and visitors were present.

CORRESPONDENCE.

From Dr. T. S. Hall, M.A., general secretary of the Australasian Association for the Advancement of Science, thanking the Club for the invitation to members of the Association to take part in the excursion to Cockatoo Creek on 11th January.

REPORTS.

A report of the excursion to Frankston on Saturday, 14th December, was given by Mr. J. Searle, who acted as leader in the unavoidable absence of Mr. J. Shephard. The excursion was arranged for shore life, and a good variety of objects had been secured.

A report of the Christmas camp-out at the National Park, Wilson's Promontory, was given by the leader, Mr. J. A. Kershaw, F.E.S., who reported a most successful outing. The party confined its investigations principally to the Vereker Range, and was greatly impressed with the scenery and vegetation of that portion of the park. A series of lantern slides was exhibited in illustration of the report.

A report of the excursion to Cockatoo Creek on Saturday, 11th January, was given by the leader, Mr. C. French, jun., who stated that the party was joined by several visiting members of the A.A.A.S., who were greatly pleased with the outing. Among the birds seen was the rare and shy Pilot-bird, whose nest was also found.

A report of the excursion to the Botanic Gardens on Saturday, 18th January, was given by the leader, Mr. F. Pitcher, who said that there was an attendance of 10 members. The party had a general ramble through the grounds, viewing the Hopetoun Lawn—where characteristic trees were pointed out—the Lily Lake, Orchid House, and Nursery. An inspection of the Australian plants completed the afternoon's visit.

VISITORS.

The chairman introduced to the meeting Mr. A. G. Hamilton, of Sydney, an authority on New South Wales plants; Mr. C. P. Conigrave, an ardent worker in the ornithology of Western Australia, who was recently engaged in the exploration of

North-West Australia ; and Professor Tilden, of the University of Minnesota, U.S.A. Messrs. T. S. Hart, M.A., and H. B. Williamson, country members, were also present.

Messrs. A. G. Hamilton and C. P. Conigrave briefly replied, thanking members for their very cordial welcome.

Professor Tilden expressed very great pleasure at what she had seen during her short sojourn in Australia, and stated that field excursions were also made from her university, sometimes to places 2,000 miles distant.

PAPERS READ.

By Messrs. G. A. Waterhouse, B.Sc., B.E., F.E.S., and G. Lyell, F.E.S., entitled "Description of a New Lycænid Butterfly, with Notes on its Life-History."

In the absence of the authors the paper was read by Mr. G. Coghill. In it the authors stated that on several occasions, both in New South Wales and Victoria, the females of a Lycænid butterfly, somewhat resembling *Pseudodipsas cyrillus* of Anderson and Spry, had been taken, but whether the specimens were females of that butterfly or a distinct species could not be determined until the current season, when eggs, larvæ, and pupæ of the supposed new species were obtained at Ocean Grove, Victoria, from which a series of butterflies was obtained, proving it to be a new species. Like many other Lycænid butterflies, the larvæ are associated with ants, hence the name chosen for the new species—*P. myrmecophila*. Some interesting notes on the life-history of the butterfly were included in the authors' remarks.

Mr. R. W. Armitage, M.Sc., said that the authors mentioned that probably the larvæ were fed by ants. Mr. Dodd, of North Queensland, had observed *Liphyra brassolis*, which lives in the nest of the Green Tree-Ant, *Oecophylla virescens*, and discovered that the ants feed the larvæ of this butterfly on their larvæ.

Mr. F. Spry said he hardly thought that ants feed the larvæ. Possibly they had some other food-plant than *Acacia pycnantha*, and night observation would prove whether they were fed by ants or otherwise.

Mr. J. A. Kershaw, F.E.S., congratulated the authors upon their discovery of a new "blue" in Victoria, and their investigations, in conjunction with Mr. H. W. Davcy, regarding its life-history. It was interesting to learn that while *P. cyrillus*, And. and Spry, a Victorian species, is considered to be a southern form of *P. brisbanensis*, though at one time thought to be the same, still another very closely allied species had now been discovered. With regard to the food of the larvæ, further investigations were required.

NATURAL HISTORY NOTE.

Mr. J. Gabriel stated that since reading his paper, "On the Mutton-Birds of Bass Strait," in January last, he had revisited the locality, and was sorry to say that his observations were very much confirmed. The birds were still being destroyed in numbers by being caught on the barbed wire fences which cross the hummocks near Cape Woolamai, and he thought that some action should be taken by the Club to have unnecessary wires removed.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Ten species of native plants endemic to Victoria and peculiar to the Grampian Mountains, collected in September, 1912.

By Mr. F. Chapman, A.L.S.—Slabs of Middle Devonian limestone—"Buchan marble"—now being used in the staircase of the new Public Library, largely composed of the "honeycomb coral," Favosites, sp.; polished block of Devonian marble from Ilfracombe, with "Stag's-horn coral," Pachypora, sp.

By Mr. G. Coghill.—Orchid, *Orthoceras strictum*, in bloom, from Ringwood.

By Mr. F. Cudmore.—Collection of fresh-water shells from Avoca station, Wentworth district, Western New South Wales; collection of fossils from the Upper Eocene (Bartonian) beds of Barton, Hampshire, England.

By Mr. J. E. Dixon.—Coleoptera from Lake Hattah, N.W. Victoria, including *Carenum cordipenne*, *Stigmadera bakewelli*, *S. fulviventris*, &c.

By Mr. C. French, jun.—Coleoptera collected on the excursion to Cockatoo Creek, 11th January, 1913.

By Mr. C. J. Gabriel.—Victorian marine shells, *Cypraea angustata*, Gmel., and five varieties.

By Master Karl A. Glance.—Specimens of *Glossodia brunonis*, *Caladenia flava*, *Anigozanthos preissii*, *A. viridis*, and *A. manglesii*, from Mundaring, Western Australia.

By Mr. J. T. Hamilton, F.L.S.—Fossil wood from Dargo High Plains.

By Mr. J. Searle.—Crustacean, Callianassa, sp., dug out of sand at low water, and young pipe-fish, from Frankston excursion; land crustaceans and earthworm, from Cockatoo Creek excursion.

By Mr. P. R. H. St. John.—Herbarium specimens of *Haloragis elata*, A. Cunn., Tall Rasp-wort; *Bassia sclerotænoides*, F. v. M., and *Kochia aphylla*, R. Br., Spiny Blue-bush, all collected Bacchus Marsh district, 7th December, 1912; also *Leucopogon (Styphelia) juniperinus*, R. Br., Juniper Beard-heath, from Brisbane Ranges, October 1912—all

previously unrecorded for "south" of Victoria—collected by exhibitor and Mr. J. G. O'Donoghue.

By Mr. H. B. Williamson.—Dried specimens of Victorian ferns.

By Miss Bage, Messrs. Kershaw, Robertson, Shephard, and Williamson.—Series of photographs of National Park.

After the usual conversazione the meeting terminated.

EXCURSION TO FRANKSTON.

ABOUT a dozen members journeyed to Frankston by the mid-day train on Saturday, 14th December, for the study of marine life. On arrival we found the tide was just about to turn, so made our way towards the rocky headland beyond the township, in order to investigate the rock-pools before they again became submerged. The most striking feature of the day was the enormous numbers of the European Shore-Crab, *Carcinus mænas*, found everywhere. This crab is now thoroughly naturalized in Port Phillip, and is supposed to have come here in the bottom of some wooden ship, as it was first observed at Port Melbourne, from whence it has gradually spread round the bay. Numerous specimens were found under the stones, such as sea-planarians, starfish, sea-urchins, and chitons; several of the latter were roughly dissected so as to show the radula or lingual ribbon. On the sand between the tide-marks numerous burrows were observed, which, on being investigated, were found to have been made by a species of *Callianassa*, a specimen of which was secured. It is a crustacean, notable from having one of its claws of much larger size than the others. While digging for them several worms were collected, many of which were of great length, but extremely brittle. Being unable to secure a boat in order to make use of a tow-net, we made casts of the net from the pier, securing a great variety of specimens. The water was crowded with diatoms, mostly a cushion-shaped species. The nauplius forms of the Barnacles, *Lepas*, and *Sacculina*, also the cypris form of the latter, were taken. The Copepoda consisted of a few *Calanidæ* and *Centropagidæ* and numerous *Harpacticidæ*; the species identified were *Centropagus typicus* and *Idya furcata*. Three species of rotifers of the genus *Synchaeta* were taken, also several specimens of those curious little animals, the arrow-worms, *Sagitta*, sp. *Zoæ* and larval forms of crabs, also larval forms of various molluscs and worms, and a young pipe-fish, *Syngnathus*, sp., were among the captures.—J. SEARLE.

EXCURSION TO COCKATOO CREEK.

FINE weather favoured the excursion party to Cockatoo Creek on Saturday, 11th January. Twenty-two members and friends, including several visiting members of the Australasian Association for the Advancement of Science from other States, were present. Cockatoo Creek station, situated in the recesses of the Gembrook Ranges, on the narrow-gauge line from Ferntree Gully, some 36 miles from town, was reached about one o'clock, when a shady spot alongside the creek was chosen for lunch. As Mr. J. Gabriel had thoughtfully provided a couple of "billies," tea was soon ready, and proved very acceptable after the long train journey, more especially as the day had turned out rather warm. After luncheon we walked down stream towards the railway bridge, meeting with a number of interesting specimens by the way. Logs were turned by the entomologists in search of ground beetles, and a member eager for planarian worms was rewarded by the capture of half a dozen species. The forest country yielded many interesting plants, especially to the botanists from other States. The Banyalla, *Pittosporum bicolor*, was noticed growing from tree-fern trunks, as also were several other plants, including the orchid *Chiloglottis gunnii*. Mr. J. R. Tovey, of the National Herbarium, who was one of the party, collected about thirty-five species of plants in bloom or in fruit. Among these may be mentioned the Christmas-bush, *Prostanthera lasianthos*, which was at its best, the Musk Aster, *Olearia argophylla*, and the Saw Senecio, *Senecio vagus*. Birds to the number of about thirty-two species were noticed, among which were the somewhat rare Pilot-bird, *Pycnoptilus floccosus*, the handsome little Rufous Flycatcher, and the Lunulated Honey-eater. The nest of the Pilot-bird, rarely seen, was found in a secluded spot. After a ramble of a couple of miles we retraced our steps to the camping-ground, where Mr. Gabriel again made tea for the party. After tea Dr. J. A. Leach, president of the Club, expressed the pleasure members had in having the Science Congress visitors present at the outing, which was typical of many made by the Club every season, the visitors, in reply, stating that they had spent a very pleasant and profitable day. The return journey seemed to pass quickly, town being reached soon after 9.30 p.m. Insects were rather scarce, only a few of the commonest butterflies being seen; but of Coleoptera some thirty species were taken, the following being the most noteworthy:—*Lissotus furcicornis*, *Apasis biplegenoides*, *A. howitti*, *Coripera ocellata*, *Notonomus peroni*, *Diphucephalai frenchi*, *Pseudoceneus*, sp., and *Siagonyx*, sp.—C. FRENCH, JUN.

ONE OF NATURE'S WONDERLANDS—THE VICTORIAN GRAMPIANS.

By J. W. AUDAS, F.L.S., National Herbarium, Melbourne.
(Read before the Field Naturalists' Club of Victoria, 9th Dec., 1912.)

My admiration for our beautiful flora has frequently led me to the farthest corners of our State, and during the last Easter vacation I set out with the intention of seeing some of the floral beauty of the Grampians, well named the garden of Victoria, but bad weather compelled me to abandon the visit. It can therefore be imagined, after my disappointment, with what pleasure I received an invitation from the Hon. W. H. Edgar, Minister of Public Works, to accompany him and a parliamentary party on a visit of inspection to this glorious wonderland on 5th September, 1912; and at that gentleman's request I spent ten days in the district, visiting the more interesting places, with the view of reporting on their attractions for visitors.

My observations were naturally of a botanical nature, but I was, nevertheless, not unmindful of the many other beauties, which are such as to raise the unbounded admiration of all beholders, and I marvelled that this beautiful mountain district, replete with every variety of scenery the eye could admire or the heart desire, should be so little known. That a place of such exceptional beauty, far surpassing mountain districts in other States which are advertised through the length and breadth of the world, should be merely placed in the dull monotony of "places suitable to visit" in a tourist list, and that its beauties could be described in the set terms which would suit any district, seemed incredible. No orthodox description, no set terms, are sufficient to describe the glorious Grampians, whose beauty, in its endless diversity, would defy the brush of an artist to reproduce or the pen of an author to adequately describe. If these mountains were situated in the wilds of Croajingolong or a hundred miles from a railway terminus one would not wonder at their attractions being unknown, but they are, on the contrary, very easily accessible, being practically situated on the main Melbourne-Adelaide line. Six hours' luxurious railway transit from Melbourne, followed by a two hours' coach ride from Stawell, places one in the heart of a district displaying unapproachable attractions on every side. Any literature relating to the scenery of the Grampians which I had previously chanced upon had invariably conveyed to my mind the impression that the Grampians were really huge rock-masses, of gigantic grandeur undoubtedly, but, nevertheless, barren and uninteresting. How thoroughly this impression was dispelled may be imagined when I beheld the beautiful typical vegetation,

shaded fern valleys, splashing waterfalls, swift-flowing streams, and green, smooth mountain slopes. Serried rocks and bold escarpments there were indeed in plenty, but all essentially different from anything one could imagine without seeing—towering pinnacles that seemed to pierce the sky, showing glorious panoramic views of entrancing loveliness to those who have sufficient agility and daring to scale their heights. Over and above all prevailed a beautiful natural colouration of the rocks, varying from pale lemon-yellow, rosy pink, and gorgeous chrome to russet red, which were often embowered by, and in complementary contrast to, the native foliage. The sightseer, even when equipped with travelling facilities, could spend a month among the Grampians and yet not see all their beauties; but I endeavoured, in the short time at my disposal, to visit most of the better known parts, and will mention a few of the trips which would be attractive to the tourist.

By starting out from "Bellfield," about three miles south of Hall's Gap, the usual way of approach to the Grampians, and following a fine zig-zag track, recently constructed by the Public Works Department, under the supervision of Mr. McCormack, one is led through the "Devil's Gap," and, by a short divergence, to a recently discovered rock of curious formation, which has been appropriately named "Mushroom Rock," for, though weighing about 50 tons, it is supported solely by a small stalk-like pedestal. Thence upwards the path leads to the famous "Sundial Rock," a ponderous mass of sandstone, of flat formation, which is advantageously situated for viewing Hall's Gap and Mount Rosea, whose cliffs, towering hundreds of feet in height, seemed, when viewed from this point, to be absolutely inaccessible; but I was to find on the following day that Nature had provided a remarkable stairway to ease their ascent.

A few miles further up Hall's Gap a well-constructed winding track has been cut on the mountain side, which leads to Mount Rosea, passing *en route* the beautiful, smooth-flowing falls, solitary and peaceful, and which have been appropriately named "Silver Band," thence through long glades of tree-ferns and mountain gums to the foot of the Grand Stairway. This peak, which was formerly called the "Goat Rock," has been named Mount Rosea in admiration of the beautiful native shrub, *Pultenaea rosea*, "Rosy Bush-pea," which is found nowhere else in Australia but here and upon Mount William. This stairway is a natural formation of steps, of which I was previously unaware. It runs perpendicularly 800 feet up the face of the sandstone cliffs and seems more difficult of ascent before being negotiated; but were the climb ever so strenuous it would be amply rewarded by the views to be obtained at the summit. One seemed to be elevated

upon a towering pedestal on the dividing line of the river basins of Victoria, with the world far, far beneath, the beautiful fertile area of the Victoria Valley stretching in seemingly limitless distance to the south-west, and to the north-east the basin of the Little Wimmera, flat sandy country through which this little giant works its way, gaining volume and breadth in progress.

A delightful change of scenery, and welcome rest for tired mountain climbers, may be enjoyed by spending a few days in the vicinity of the "Borough Hut" (970 feet), which is situated at the head of the Stawell water supply and about five miles south of "Bellfield." Here one may wander at will through mossy glens and along the banks of watercourses, where creepers interlacing above the stream hang floral festoons, and beautiful native shrubs jostle for pride of place. All this vegetation is in primeval loveliness, man so far not disputing with Nature in her reign supreme. A Rhamnaceous shrub, *Trymalium D'Altoni*, has been named after a family long resident of the district—the Messrs. D'Alton. An uncommon shrub, *Conospermum Mitchelli*, quite one of the best to be met with in the Australian bush, was here seen in prolific splendour; its graceful foliage, surmounted by huge white flower-heads, gleamed in snowy purity that seemed to be accentuated by frequent contrast with the deep magenta flowers of *Bauera sessiliflora*, Showy Bauera.

Still further variety and yet wilder forms of Nature are to be viewed during a stroll to Barbican Rock, which towers several hundreds of feet overhead and descends fully the same distance into a valley, where the lovely stream known as Barney's Creek winds through almost impenetrable undergrowth. Along the side of the Barbican the track of the water-flume has been cut, and at the end crosses Barney's Creek by means of a siphon. The view of the water issuing from the siphon, although the work of man rather than Nature, is one to be greatly admired. About half a mile further along stands Barney's Castle, which is formed by two high walls of rock rising sheer from the water's edge and leaving just sufficient opening for a gateway between. By following the water-race the Grevillea and Bovine Creeks are reached, and those lovers of Nature who are sufficiently hardy to struggle with her in her wilder forms may start from this point and follow Fyans Creek to its source, where a tiny stream will be found trickling from beneath some rocks at the foot of mighty Mount William.

To climb this great mountain, the King of the Grampians, 3,830 feet in height, is a task not to be lightly undertaken, but those who do accomplish its ascent will pronounce it to be the crowning point of beauty in this glorious mountain area, as it undoubtedly is. The best starting point is from the

"Borough Hut," whence a very early start must be made, and after crossing Bovine Creek and Fyans Creek the weir of the Stawell water supply is reached. Hence all track and guide marks are left behind, and, striking a sideling slope, one follows hopefully along, feeling quite sure that the summit must be very near at hand, but surprise is great indeed when one suddenly emerges upon a giant cliff face, with a beautiful valley lying thousands of feet below, and Mount William in sublime majesty towering up from the further side of the valley. A winding track leads down the gorge, and, looking back upon the enormous rock, one is reminded of some great church or monument, and realizes that he has just passed the famous Cathedral Rock. The rest of the journey is accomplished by ascending a winding track around the mountain side, and when the top is really reached one pauses in wonder, feeling awed by the grandeur of the spectacle before, or, rather, beneath him. Stretching away into far distance are the fertile plains of Western Victoria, outlined by the faint blue of far-off mountains, while nearer at hand, and seemingly beneath one's feet, are crowded in gigantic confusion the other densely-wooded peaks of the Grampians and also Serra Ranges.

One could gather from my preceding remarks that this district would prove attractive to people of varied interests. All could find some material for his hobby, be he geologist, botanist, or artist, while those devoted to sport would soon find prey for rod and gun. The agriculturist, even, in his quieter tastes, could find relaxation and possibly enlightenment in a trip to the Pomonal orchards, which are five or six hundred acres in extent, and yield the rich harvest of 1,000 tons of fruit annually. The crop, being mostly apples of keeping qualities, is shipped to the German and English markets. This ideal little settlement, occupying a semicircle at the foot of Mount Cassel, has a very prosperous appearance. Many fine residences are surrounded by ornamental trees and handsome shelter belts of olive, hazel, and walnut.

To reach Pomonal from Bellfield one follows the main road up the Fyans Creek valley, then across Myrtle Bank Farm, which is owned by Mr. Warren, a successful potato-grower, to the tunnel of the Stawell water supply, which has been cut for three-quarters of a mile through the mountains, the outlet being near Pomonal. Thence the water is conveyed eighteen miles over fairly level country to Stawell, and completes a siphon, which is one of the best water schemes in the State. Between Pomonal and Hall's Gap, along the eastern face of the Mount William Ranges, is a stretch of about 4,000 acres of fruit-growing land, lying waste, equaling in richness the first-named settlement, and which is to be immediately thrown open for selection. In this neglected

area many fine shrubs of *Grevillea olcoides*, Olive Grevillea, were flowering handsomely, and *Correa speciosa* was met with in red, pink, and green forms.

The trip which I appreciated most was that to the famous "Wild Flower Garden." This covers a large area lying to the east of Hall's Gap, and can be reached by various ways, but the easiest is probably an old bush track branching south-east from the main Stawell road, a short distance outside the Gap. This path will lead flower-seekers through a veritable paradise of beauty, and those who wander forth to gather blossoms will be surfeited. Probably two hundred species of flowering plants could be found in this area, many of them peculiar to the Grampians, but it would be impossible in the course of this article, which is not essentially botanical, to deal satisfactorily with such a variety of flowers. The botanist visiting here would soon become the fortunate possessor of a well-filled vasculum. It is a matter for regret that a recent bush-fire should have swept over some of this lovely area and temporarily marred its beauty. The supreme suitability of the locality for flowers was even borne out by the prolific growth of cultivated varieties, for on the site of an abandoned homestead daffodils and snowflakes bloomed magnificently, and an extremely fine specimen of *Acacia decurrens*, variety *normalis*, the Sydney Green Wattle, was smothered in blooms, the limbs actually breaking with their weight. A cultivated specimen of *Callistemon coccineus*, the Red-flowering Bottle-brush, here also attained beautiful development. By following the same track in its gradual ascent, the "Mummy Rock," and another peculiar formation known as the "Rockery," are passed. Around the base of the latter rocks, the well-known Grampian plant *Thryptomene Mitchelliana* grew abundantly, and many young shrubs suitable for transplanting could be secured. It is very beautiful, thrives well under cultivation, and its ornamental qualities for parks and gardens are beginning to be appreciated. Thence onwards the path leads to the top of "Boronia Peak," which has been appropriately named, as the three Boronias of the Grampians all flourish upon it. Their perfume when blooming is delightful, and suggests that the naming of places by such typical titles is one that should be more frequently adopted. We have among our most lovely scenery too many uneuphonious names, such as Devil's Gaps and Hell's Gates, which places might otherwise bear the name of some beautiful native plant growing upon them.

An excursion to be greatly recommended, but which cannot well be accomplished in one day, is a visit to Lake Wartook and the M'Kenzie Falls on the other side of the Mount Difficult Range. Visitors to these parts would be well advised in devoting two or three days to the trip, and

to provide themselves with food supplies, as there is no accommodation to be obtained at either of these places. The journey must be accomplished either on foot or horseback, and a bridle track leads the tourist up the Stony Creek valley, then along a sideling from which a good view of the "Epacris Falls," situated on a fine creek known as the Gulf Stream, may be obtained. Water of crystal purity flows permanently in this stream, and its banks are graced by many fine King Ferns, *Osmunda barbara*. In this vicinity, as the name indicates, the Epacris, or native heath, blooms in prolific beauty, and for a longer period than is known elsewhere. The corolla-tube of the flower-spike seems to here attain a much greater development, and the flowers may be obtained in pink, white, and red. One may also frequently find double-flowering specimens. On a saddle between the hills hereabouts will be seen a forest of fine eucalyptus, principally *E. obliqua*, Messmate, and *E. macrorrhyncha*, Stringybark, the trees in many cases towering 70 or 80 feet before branching.

At the summit of this range a large porphyry dyke formation protrudes through the sandstone, and I noted that wherever the porphyry was met with timber attained greater size. From this eminence is seen a fine view of the Victoria Valley, stretching away southward for many miles, with the picturesque Serra Range rising tier upon tier above it. This lovely valley, tucked away in the mountains, and almost uninhabited, should prove an ideal site for reservation as a National Park. When descending the Wartook side of the range, on a peak of Mount Difficult, a comprehensive view of the famous Wonderland country may be obtained, also of Mount William and Mount Rosea, further on. In this vicinity a strange-looking plant abounds. It is known locally as Wild Gooseberry, but is really *Leptomeria aphylla*, a Santalaceous shrub belonging to the same family as the Wild Cherry. It is quite leafless, but bears abundant crops of edible berries, which are relished locally as a dessert and are also made into jam. From this point forward primeval forest must be penetrated before the banks of Lake Wartook are reached. It is a fine artificial lake which has been formed by building a huge bank between the mountains, and is therefore picturesquely situated, being surrounded by lovely vegetation and studded by several islands. The bank is about three-quarters of a mile in length, and a caretaker lives in a cottage at the further end. He and the forest ranger are probably the only residents of this end of the Victoria Valley, so that native animals are not disturbed in their haunts. Kangaroos and introduced deer thrive among the hills, while flocks of emus may frequently be seen.

In the course of another two miles we came upon two of

the best waterfalls in the Grampians. "Broken Fall," which is in three sections, is composed of numerous cataracts falling from about fifty feet in height and framed by beautiful masses of Coral Fern, *Gleichenia dicarpa*, and *Restio tetraphyllus*. The latter, locally known as Emu-grass, is very ornamental, and when in bloom shoots up clusters of tall stalks, surmounted by graceful heads of rich russet hue. Though divided by no great distance, a striking dissimilarity exists in the appearance of these and the "M'Kenzie Falls." The high, rugged cliffs of the latter, towering 150 feet in height, its waters crashing on the hard porphyry boulders at its base, and sending forth huge clouds of spray, form a striking contrast to its quiet-flowing, fern-bowered neighbour, but there is, nevertheless, an enchantment in its fierce grandeur which draws many admirers to its feet, who pronounce it to be the best fall of the Grampians. It has, indeed, an even greater volume of water during the summer months, when its flow is augmented by the irrigation water for the Mallee which is drawn from Lake Wartook. Unfortunately, there is considerable difficulty in finding its locality, and a properly constructed track is urgently needed. At present the public are indebted to the disinterestedness of the caretaker at the lake for providing such facilities as exist to see these falls. He has blazed a track for the last mile, and suspended a wire from tree to tree down the side of the mountain. The gorge is, in places, fully 500 feet deep, walled by perpendicular cliffs, and it would be almost impossible to descend but for this thoughtful assistance. Many visitors have journeyed to this part and left after viewing only the Broken Fall, under the impression that they had seen the M'Kenzie Falls, and it can therefore be readily perceived that proper means of locating them should be constructed. Growing among the rocks at the foot of the falls were several fine shrubs of the locally rare and very beautiful plant *Hovea longifolia*, Long-leaved Hovea, whose pale blue flowers pleased the eye, while the perfume of many Blackwood trees, *Acacia melanoxylon*, in bloom, soothed the senses.

Doubtless to the ordinary sightseer the trip which will afford the most charm and leave the most pleasurable reminiscences, is the exploration of "Wonderland." Wonderland indeed! Well has this enchanting area been so named. Its beauties are innumerable, and one falters in attempting their description, feeling the impossibility of painting a word picture sufficiently glowing to convey to the reader even a slight idea of the singular beauty. Being only about two miles from Hall's Gap, and not calling for over much exertion, no visitor to the Grampians should leave without seeing this phenomenal part. On the way, if the jinker track to the favourite picnic ground at Splitter's Falls is followed,

Stony Creek and Venus' Bath, and a beautiful succession of falls known as Cherry-tree Falls, winding down the hills towards Mackay Peak, may be seen. A very singular appearance, accentuated by its densely wooded surroundings, is presented by Signal Peak, which stands barren and furrowed as though torn by some giant plough.

Hereabouts occurs a geological formation which is very singular. An outcrop of sandstone with dykes of porphyry protruding through it may be seen, then the formation is composed by alternating areas of both stones, the join being plainly discernible. From an excavation in the sandstone interesting souvenirs of the locality may be secured. These are pieces of the stone with dendritic markings upon them. Many are very beautiful, the designs of ferns and grasses being very clearly imprinted. A little to the left is "Look-out Rock," a curious mushroom formation which points out the direction to the "Grand Canyon," but before it can be reached it is necessary to cross the Stony Creek on a rough log bridge. The canyon itself is formed by walls of sandstone about 300 feet high, with many curious natural carvings in the shape of pagodas upon them. Its termination has been made rather abrupt by a huge fall of the rock, over which flows a beautiful waterfall known as the "Bridal Veil."

After pausing long in admiration, one begins the ascent to the top of the canyon by a pathway up the rocks along which iron spikes have been driven into the sandstone to assist climbers, and emerges at what might be considered a dangerous point, almost within the jaws of the "Whale's Mouth." This phenomenal mass of sandstone, shaped by the action of water in past ages, presents a perfect resemblance to that great animal. Soon after leaving his gigantic majesty, the curious formation known as the "Towers of Time" may be seen. Near at hand is the "Cooling Chamber," a large cave about 80 feet long by 30 broad, formed mainly by a large overhanging mass of sandstone, and, as may be inferred from the name, its atmosphere is always cool. Even upon the hottest day one may always find therein a cool retreat. The further end, formed in tunnel shape in the rocks, does not receive any sunlight, and artificial light is needed to explore its depths. Sandstone cliffs shooting up abruptly, with unbroken perpendicular walls of great height, and reminding one of some immense military barracks, extend from this point for about a quarter of a mile. At their base, in beautiful confusion, grew many native plants. The curious-shaped flowers of *Grevillea alpina* were almost hidden from view by the orange, bell-shaped blooms of that pretty little climber *Marianthus bignoniaceus*, and the air was rendered fragrant with the perfume of *Acacia myrtifolia*, Myrtle Acacia. Soon after admiring their

tender beauty one experiences something of a shock on coming suddenly in sight of a huge human skull, standing grimly weird against the sky-line. Thence, crossing a depression, we pass and duly receive our christening at the "Shower Bath." The water drops from this fall in the form of a shower, besprinkling the path, so that pedestrians cannot avoid a wetting—hence the name, "Shower Bath." We are now introduced to the "Menagerie." Here a number of curious-shaped rocks representing animals may be seen, there being three owls, a hare, a tortoise, and a fox, squatting in solemn sedateness, as though discussing some important animal enactment. Next object of attraction is the "Toadstool Rock," which is eagerly climbed to secure a first view of Wonderland.

Wonderland at last. Beautiful, grim, curious, and enchanting as have been the sights on the way, infinitely greater wonders await us, and we push forward with eagerness through the "Silent Street." This street is formed by cliffs of great height running parallel to each other, leaving but a narrow space between and almost meeting overhead, so that

"Not a setting beam could glow
Within the dark ravine below."

But at noon there is ample daylight, which is necessary, as progress has been rendered difficult by the action of "hoodlums," who have rolled down great boulders from above, for the pleasure (?), or, say, novelty, of hearing them crash below. This conduct should be stopped, as they are rapidly spoiling a unique spectacle. Ferns and mosses of rare beauty hide shyly in the rock crevices, and many lichens and mosses decorate the boulders, including the lichen *Clathrina retipora*, which is locally known as "Coral Moss."

Upon emerging from the "Silent Street" we salute the "Unicorn" and proceed to try our agility upon the "Nerve Test." The latter is a narrow, arch-shaped natural bridge, stretching over a cleft in the rock about 40 feet deep, and one would indeed require steady nerves to cross it and return safely. Up to this point a clearly defined track has been followed, but the whole area hence to Wonderland Peak consists solely of sandstone, and a broad arrow upon the rocks furnishes guide marks to the summit. Before ascending we salute the "Fallen Giant," a huge mass of fallen stone. Wonderland Peak is the great pinnacle which can be so plainly seen from Hall's Gap. From the top a fine view may be obtained, showing Stawell outlined by the blue of the distant Pyrenees and laced by the silver thread of Fyans Creek winding through the valley. In the opposite direction glimpses of the Victoria Valley may be seen through the rugged and wooded mountains. But we must not let our

attention be wholly absorbed by the view, for there are objects near at hand to admire. The rocks here present so perfect a resemblance to a "Giant Grand Piano," complete even to the stool, that one would almost think it were the work of a sculptor. Many climb up and pretend to play upon it, and a gentleman of ponderous proportions, who, in rollicking mood essayed to play and sing a "Pean of Praise," broke the stool from its pedestal. It is a fortunate matter that he did not break his neck as well by rolling down into the caves below. But "All's well that ends well," and the local people are about to have the stool repaired. On the top of the peak is a perfectly formed seat on which one may rest his limbs, and, while admiring the view, test his lungs to hear the famous echo. All sounds, whether singing, whistling, or cooeeing, reverberate perfectly.

Many other peaks are over 2,000 feet above sea-level and have cliffs 700 or 800 feet high. They have been made very easy of access by tracks constructed by the Public Works Department. For the sake of variety one of these routes may be followed on the return journey. After descending to 2,000 feet level *Eucalyptus alpina* is met with. Being a eucalypt that does not attain great proportions, it was pleasing to see specimens about 4 feet 6 inches in circumference at three feet from the ground. It is peculiar to the Grampians, being found nowhere else in Australia but upon the highest of these peaks. A beautiful plant, which will wave welcome to visitors with its graceful pendulous branches and plumes of scarlet flowers about Christmas time, is *Humea elegans*, Plumed Humea. It grows in plenty on the Wonderland Peak. Thriving among the rocks in profusion are thousands of the liliaceous plant, *Stypandra glauca*, its flowers, a pale indigo, sprinkling the rocks like veritable

"Scaps of the blue

Dropped from the skies where the wee stars peeped through."¹

The last of the rock phenomena is seen in the "Muzzled Monster." This formation is very unique, and presents the appearance of some great monster with a muzzle on, the ropes of which, formed by seams of quartz, being very distinct.

Throughout my wanderings in these interesting parts I was accompanied by Messrs. C. and F. D'Alton, who have resided there all their lives and are thoroughly acquainted with the district. As many of the more beautiful parts cannot be visited without the assistance of a guide, I would like to mention that the services of these gentlemen are always available in that capacity. Visitors may rely upon being shown by them all the beauties, and saved from any danger, which element is always present in mountaineering.

DESCRIPTION OF A NEW LYCÆNID BUTTERFLY,
WITH NOTES UPON ITS LIFE-HISTORY.BY G. A. WATERHOUSE, B.Sc., B.E., F.E.S., AND G. LYELL, F.E.S.
(With Plate.)*(Read before the Field Naturalists' Club of Victoria, 20th Jan., 1913.)*

As long ago as October 1897 we captured a female butterfly at Como, some thirteen miles south of Sydney. It suggested *Pseudodipsas cyrillus* of Anderson and Spry, but was of smaller size, frailer build, different shape, and with broader markings beneath. In February 1898 we caught another female in the same locality, and still another reached us from the Dandenong Ranges, Victoria, in November 1902. We took yet another of the same sex at Killara a few miles north-west of Sydney in January 1904.

Whether the female of the rare *P. cyrillus* was singularly variable, or whether the butterflies in question represented a quite distinct species, was a difficult question to determine, especially in the absence of the male. All doubts have now been cleared up by the discovery at Ocean Grove (Victoria) of the ova larvæ and pupæ of the smaller species, and the breeding from them of a long series of both sexes, constant in size, shape, colours and markings.

In October 1910 one of our fellow members, Mr. H. W. Davey, while searching ants' nests for Coleoptera, came across Lycaenid larvæ, and from them bred *Miletus ignita* and a couple of examples of the butterfly that had puzzled us. The following year he sent us some pupæ of both species, and from these we bred in Gisborne a small series of each. In October 1912, under the guidance of Mr. Davey one of us visited Ocean Grove, Victoria, and secured a series of the eggs, larvæ and pupæ of both butterflies.

The ova of the *Pseudodipsas* we found in patches of 40 to 50 (evidently each patch the produce of a single female) upon small dead tree stumps within a plantation of Golden Wattle, *Acacia pycnantha*. Some of these patches of eggs were deposited upon stumps at least ten yards distant from the nearest *A. pycnantha* tree, and it seemed impossible that larvæ fresh from the egg could travel so far to the foodplant. Both larvæ and pupæ were found sheltering within the galleries of the nests of the little black ant *Iridomyrmex nitidus*, and these ants were present in each of the stumps upon which we noticed ova. We brought away not only ova, larvæ, pupæ, and two captured butterflies, but also two colonies of the ants with their larvæ and pupæ, and several of the smaller stumps. Both in Gisborne and in Sydney we bred from these pupæ a long series of both sexes of the butterfly. These emerged

from 30th October to 5th December, and easily determined it as an undescribed species.

The ova and larvæ were taken to Sydney and there watched carefully. The former hatched on 10th November and were at once provided with young *Acacia pycnantha* and eucalyptus foliage, but we could not induce them to eat either. Once we found them feeding upon slices of apple introduced in the breeding cage for the captive ants; but they did not thrive. We tried transferring some of them to a nest of *I. nitidus* in the open, but our efforts were resultless; we were not successful in keeping them till the first moult.

We had better fortune with the twenty well-grown larvæ taken from the ants' nests at Ocean Grove. These would not touch the eucalypt, and fed but very sparingly upon the *A. pycnantha*, but they appeared to be fond of the apple. They pupated during November and the butterflies emerged from the 29th November to the 18th December.

Mr. Davey suggests that the ants feed the butterfly larvæ. In view of the distance many of the eggs were deposited from what appeared to be the foodplant, this seems feasible. The ants were continually running over the larvæ and cleaning them, but though we watched carefully for the feeding process we did not succeed in observing it. The small amount of apple, and the very small surface of *A. pycnantha* leaf eaten, seemed to be totally inadequate for the larvæ, if we might judge from the quantities of the same foods consumed in an adjoining breeding cage by the larvæ of *M. ignita*. Had the food supply been deficient, a proportion at least of dwarf imagines should have resulted: except for the few preserved for cabinet specimens, all twenty larvæ pupated: each one of these produced an imago and not one of these was of less than average size. The butterflies, both captured and bred from the pupæ, are very constant in size, so even a slight decrease of size in a series such as this would be easily noticeable.

Before describing the new species, the following life history notes appear worthy of record.

Ovum. White: height twothirds that of width: densely and very finely pitted: micropyle about onequarter the diameter of the egg. One patch of ova contained 35 deposited close together, and 13 others at a distance of about one inch. Other patches contained about the same number, so we concluded the 48 ova were deposited by the one female.

Larva. When freshly emerged these are pale cream in colour, with a black head and without visible markings. In the last instar they are of a general brownish colour with brown head: the dorsal surface is covered with a series of somewhat indefinite truncated whitish triangles narrowing towards the

head : each segment has an irregular pinkish brown line, and a series of brownish or greenish blotches. The larva is devoid of hairs, except for a few along the edges of the anterior segment within which the retractile head is withdrawn when resting. The spiracles are small and dark brown, and the anal plate is grey-brown : the dorsal honey-gland is single and rather inconspicuous. The movements are much more active than usual with Lycænid larvae.

Pupa. Small : smooth : circular in cross section : of the usual Lycænid type : golden brown, with wing cases darkening to brown-black before emergence : attached by the tail and a central girdle, in groups of eight or ten, to the walls of the galleries of the ants' nests, or singly or in smaller groups within cracks of the dead tree stumps. Near the surface of a crack in one of the stumps brought from Ocean Grove was a single pupa : this stump we exposed to the sun and the pupa was placed close to the glass of the breeding cage : within a very few minutes the ants had sheltered it from the heat and light by filling the crack above it with a layer of rubbish.

Imago. The butterflies nearly all emerged on hot sunny days and always before noon. When resting on the stumps with only the undersurface of the wings exposed they were very inconspicuous. The ants ran about and climbed over the freshly emerged butterflies without in any way disturbing them. Neither sex had any definite precedence in emergence.

PSEUDODIPSAS MYRMECOPHILA, n. sp.

Expanse (centre of thorax to apex of forewing). Male, 11-12 mm. Female, 12-14 mm.

Forewing with costa slightly arched : apex rounded : termen slightly rounded in the male and rounded in the female. Hindwing with termen evenly rounded.

Male. Above. Forewing dark bronze brown : termen lined brown-black : cilia grey-brown. Hindwing dark bronze brown : base shading to brown-black : termen narrowly brown-black, with a narrow interrupted line, broader towards tornus, bright blue, and an obscure spot between vein 2 and vein 3, and a very obscure spot nearer tornus, brown-black : cilia whitish, at veins brown-black.

Beneath. Forewing grey-brown, markings pale brown edged brown-black and then whitish : first band across cell at onethird : second across cell at twothirds and often continued below cell : third marking end of cell : fourth, discal, broad, irregular, from vein 10 to vein 1 : fifth, brown, subterminal, narrow, interrupted, from vein 7 to vein 1 ; terminal line brown-black inwardly edged whitish. Hindwing grey-brown, markings pale brown edged brown-black and then whitish : first a spot in cell at onethird with a smaller spot above and

another below cell : second a spot in cell at twothirds, with a spot above and another below cell : third a bar marking end of cell : fourth, a discal, broad, irregular band of spots, from vein 8 to dorsum : fifth, subterminal, narrow, strongly waved : terminal line brown-black inwardly edged whitish : termen with a series of obscure spots orange, that at tornus, and that between vein 2 and vein 3, clearer, larger, and centred brown-black.

Female. Above. Forewing dark bronze brown : a broad central area, reaching costa beyond cell, reaching base and almost reaching tornus, blue : termen lined brown-black : cilia grey-brown. Hindwing blue : costa and apex broadly dark bronze brown : termen narrowly brown-black with a narrow line, broader towards tornus, blue, a spot between vein 2 and vein 3 and an obscure spot nearer tornus, brown-black : cilia whitish, at veins brown-black.

Beneath as in male : spots of discal band broader : obscure orange spots of termen of hindwing sometimes extending faintly into tornus of forewing.

Localities. Ocean Grove, October, November, December. Wandin. Sydney, October, January, February.

In order to avoid confusion between this species and *Pseudodipsas cyrilus*, we have drawn up a description of the latter species in similar terms : this description we have taken from the type series bred by Anderson and Spry.

PSEUDODIPSAS CYRILUS, Anderson and Spry. *Victorian Naturalist*, vol. xiv. (1897), pp. 5, 6, 7 (with figures).

Expanse. Male, 14 mm. Female, 16 mm. Forewing with costa almost straight : apex subacute : termen almost straight in the male and very slightly rounded in the female. Hindwing with termen slightly sinuate and produced between vein 2 and vein 3.

Male. Above. Forewing pale bronze brown : termen lined dark brown : cilia grey-brown. Hindwing pale bronze brown : termen very narrowly dark brown, with a narrow line from vein 1a to vein 3, bluish white, and a spot between vein 2 and vein 3 and another spot nearer tornus, brown-black : cilia whitish, at veins brown-black.

Beneath. Forewing pale brown, markings pale brown edged brown and then faintly greyish : first band across cell at onethird : second across cell at twothirds and continued obscurely below cell : third marking end of cell : fourth, discal, narrow, almost straight, from vein 10 to vein 1 : fifth, subterminal, brown, linear, from vein 7 to vein 1 : terminal line, narrow, brown. Hindwing pale brown, markings pale brown edged brown and then faintly greyish : first a spot in cell at onethird with a smaller spot above and another below cell :

second a spot in cell at twothirds with an irregular spot or spots above cell and a similar spot or spots below cell : third a bar marking end of cell : fourth a discal curved band of spots, from vein 8 to dorsum : fifth subterminal, narrow, waved : terminal line dark brown, towards tornus inwardly edged greyish : termen with a spot between vein 2 and vein 3, and another nearer tornus, brown-black crowned orange.

Female. Above. Forewing pale bronze brown : a central area, reaching subcostal, base, and dorsum to about twothirds from base, bluish : a bar at end of cell, pale bronze brown : termen lined dark brown : cilia grey-brown. Hindwing bluish : costa and apex very broadly, pale bronze brown : termen narrowly dark brown, with a narrow line from vein 1a to about vein 5, bluish white, a spot between vein 2 and vein 3, and another spot nearer tornus, brown-black : cilia whitish, at veins brown-black.

Beneath as in male : bands slightly broader and darker brown.

The markings of the undersurface are very much narrower in *P. cyrilus* than in the smaller *P. myrmecophila* : the shape of the hindwing readily separates the two species. *P. cyrilus* is probably but a southern race of *P. brisbanensis* Miskin, which is known by the type female only, taken, as the name indicates, near Brisbane. One Victorian female of *P. cyrilus* in our possession, differs very slightly indeed from the type *P. brisbanensis*, excepting that it is smaller.

EXPLANATION OF PLATE.

Pseudodipsas myrmecophila, n. sp. Figs. 1, 2, 3, male ; 4, 5, 6, female ; 7, 8, pupa.

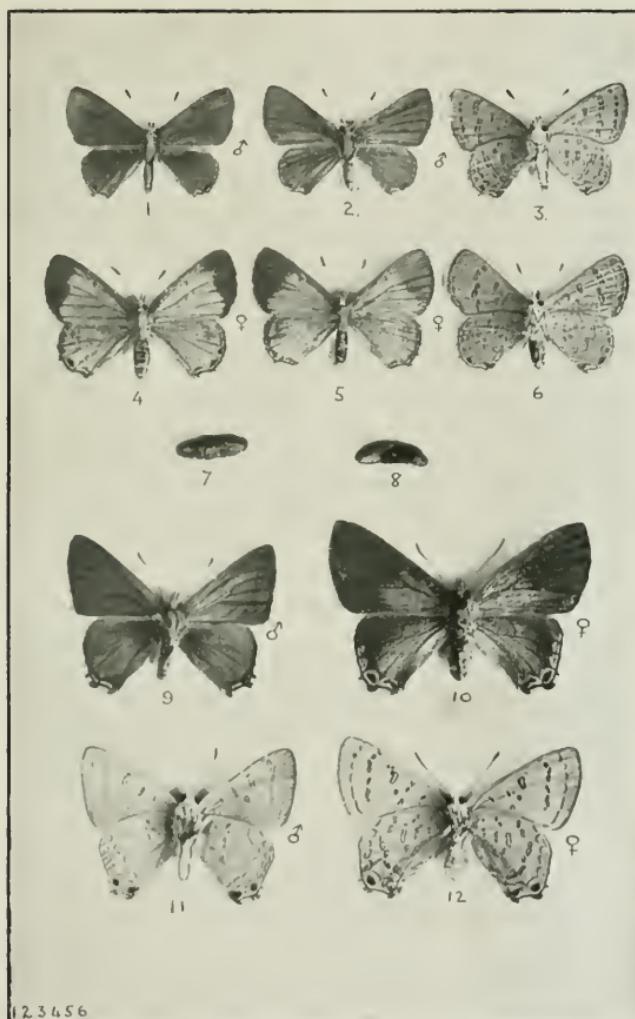
Pseudodipsas cyrilus, And. and Spry. Figs. 9, 11, male ; 10, 12, female.

NOTE.—Figs. 9, 10, 11, 12, include the types, but no specimen was actually labelled as type.

GOVERNMENT ENTOMOLOGIST.—We are pleased to learn that Mr. Charles French, jun., who has been acting as head of the Entomological Branch of the Department of Agriculture since the retirement of his father, has now been permanently appointed to the position.

“THE AUSTRAL AVIAN RECORD.”—The fifth number of this journal (December, 1912) is to hand, with further additions and alterations to the names of Australian birds. The editor, Mr. Gregory M. Mathews, has abandoned his idea of lumping species under fewer generic names, and proposes no less than forty-nine new genera. Latin words being scarce, many of the bird-lovers of the different States find themselves suddenly glorified with various endings to their names, such as Harriwhitea, Wilsonavis, Campbellornis, Melloria, Mattinleya, Coleia, &c. The trinomial list of birds is further extended, and many other alterations made.

PLATE IX.



NEW LYCÆNID BUTTERFLY, *PSEUDODIPSAS MYRMECOPHILA*,
WATERHOUSE AND LYELL.

The Victorian Naturalist.

VOL. XXIX.—No. 11. MARCH 6, 1913.

No. 351.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th February, 1913.

The president, Dr. J. A. Leach, occupied the chair, and about 60 members and visitors were present.

REPORTS.

Mr. J. T. Hamilton, F.L.S., stated that the projected excursion to Gilderoy, which was to have taken place during 25th to 28th January, lapsed, owing to the small number of names handed in.

In the absence of the leader, Mr. E. C. Joshua, a report of the excursion to Beaumaris on Saturday, 8th February, was given by Mr. J. Stickland, who said that there was a fair attendance of members, but the tide was, unfortunately, too high to allow of much collecting amongst the rocks.

Miss E. Bury, leader of the junior excursion to Elwood on Saturday, 1st February, reported a small attendance of juniors. Many objects of interest were found along the shore, and those present spent a profitable afternoon.

GENERAL BUSINESS.

Mr. G. A. Keartland stated that he, in company with Dr. J. A. Leach, attended a conference respecting the close season for quail at the office of the Chief Inspector of Fisheries and Game on Monday, 16th December, at which it was decided to recommend that the opening of the quail season be altered to 1st March. He thought, however, that the date was a month too early, and strongly favoured an extension to 1st April. Ducks were to have an additional fortnight's protection, the date being altered to 15th February.

Mr. P. R. H. St. John mentioned that there were at the present time two broods of Black Ducks—one a week and the other a fortnight old—on the lake at the Botanical Gardens, and he also thought that more protection was necessary. He drew attention to the sub-leader on this subject in the *Argus* of 5th February.

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On a ballot being taken, Mr. C. P. Conigrave, *Argus* Office, Melbourne, was elected an ordinary member, and Miss M. Harris, 73 Droop-street, Footscray, a junior member of the Club.

PAPER READ.

By Mr. G. A. Keartland, entitled "Zoology of the Great Desert of North-Western Australia."

The author, who was a member of the Wells Exploring

Expedition to North-West Australia in 1896-7, gave a graphic account of the difficulties which beset the traveller in the desert sand-hills of the interior, and described, in an interesting manner, the country which was traversed by the party. The main part of the paper consisted of descriptive notes on the various animals and plants which came under his notice. He regretted being unable to illustrate his remarks by means of photographs, as all negatives were abandoned in the desert.

Dr. Sutton said he was sure that all had listened with absorbing interest to Mr. Keartland's paper, and the respect that all had for him before was very much increased.

Mr. C. P. Conigrave said that he had had an opportunity of judging for himself the hardships connected with travelling through the desert country, which he had explored further to the east, and was greatly interested in the paper.

Mr. F. G. A. Barnard asked what was the average height of the desert sand-hills.

The author, in reply, stated that the sand-ridges were from 30 to 40 feet in height; some were steep on one side and sloped gradually on the other, while others had a gradual slope on both sides. They occurred at close intervals, taking the form of parallel ridges.

NATURAL HISTORY NOTES.

Two interesting natural history notes were read, which will appear in the next *Naturalist*.

EXHIBITS.

By Mr. R. W. Armitage, M.Sc.—Walking stick made from "Fiddleback Kanuka," *Tristania laurina*, R. Br., from Club Terrace, Bemm River, East Gippsland.

By Mr. G. Coghill.—Flowering stems of *Ixodia achilloides*, R. Br., from Barwon Heads.

By Mr. F. Cudmore.—Fossil crab, *Lobocarcinus Paulino-Wurtembergensis*, from Middle Eocene of Cairo, Egypt.

By Mr. J. E. Dixon.—Thirty species of Coleoptera from the Otway Ranges, collected during January, 1913.

By Mr. P. R. H. St. John.—Herbarium specimens of *Eucalyptus Perriniana*, Rodway, collected at Dargo High Plains by Dr. Heber Green, 1st January, 1913 (new for Victoria); also Tasmanian specimens, collected by Mr. L. G. Irby, forwarded by Mr. R. T. Baker, F.L.S., of Sydney, for comparison.

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EXCURSION TO THE NATIONAL PARK, WILSON'S PROMONTORY.

GENERAL REPORT.—BY J. A. KERSHAW, F.E.S. (LEADER).

THE prominence which has been given to the National Park at Wilson's Promontory during the last few years, and the very pleasant recollections of the previous visit undertaken under the auspices of the Club, together with the keen interest taken by the members in all matters pertaining to the Park, encouraged the committee to select this locality for a second Christmas camp.

On the previous visit, during Christmas, 1905, the observations of the party were confined chiefly to the western coast of the Promontory, landing at the south-west corner of Corner Inlet, and working south as far as Oberon Bay, and thence across the Promontory to Waterloo Bay on the east coast.

On the present occasion it was decided to confine our attention chiefly to the Vereker Range and its vicinity. The range is closely adjacent to the landing-place, at the extreme south-west corner of the Inlet, and, running south to Mounts Vereker and Leonard, forms the northern end of the central range.

The party comprised thirteen members, viz.:—Mr. J. W. Audas, F.L.S., Miss F. Bage, M.Sc., Prof. A. J. Ewart, D.Sc., Ph. D., Mr. L. K. M'Nab, Mr. F. Pitcher, Miss J. Raff, M.Sc., Messrs. E. M. K. Raff, J. L. Robertson, M.A., A. J. Robertson, M.Sc., J. Shephard, B. L. Stanton, H. B. Williamson, and J. A. Kershaw (leader).

With the exception of three members of the party, none had previously visited the National Park, while for the large majority this was their first trip through South Gippsland, and therefore a new experience to them.

Leaving Melbourne by the 7.27 a.m. train on Thursday, 26th December, we reached Bennison at 1.30 p.m. From here we continued our journey for another mile and a half by horse tram—a rather novel and primitive means of conveyance—to Port Welshpool, a small fishing village, until quite recently known as Bowen, situated on the Franklin River, and within a couple of miles of the Inlet. Here, while lunch was partaken of, the luggage was transferred to the two motor boats, and everything prepared for an early start. All being ready, we left Port Franklin about 3 o'clock, the party being distributed between the two motor boats, while a small "flatty" was taken to facilitate the landing of our luggage.

The trip down the river is not interesting. The low-lying banks are lined with the well-known Spurious Mangrove, *Avicennia officinalis*, now in seed, which occurs along most of

the streams entering this side of the Inlet, as well as the beaches on the Promontory side.

At low tide the exposed muddy banks swarm with hundreds of thousands of the small Mangrove Crab, *Helæcius cordiformis*, and it was reserved until our return journey to see these and the numerous wading birds, swans, &c., which inhabit this locality.

Following the line of piles which mark the channel into the Inlet, we steered a course for Doughboy Island, where we were prepared to camp for the night should the falling tide prevent our landing at the Park.

The weather was delightful, and it was therefore decided to make direct to the landing-place at the south-west corner, and take all risks. Doughboy Island was passed close enough to give the party a rough idea of its size and general formation, while farther south Long Island, a long, low-lying island, covered with mangrove, was seen some distance off.

The trip across the Inlet in fine weather enables one to obtain an excellent panoramic view of the whole northern end of the Promontory, and the long, narrow isthmus connecting its north-west corner with the mainland. The Promontory itself appears as one enormous mass of high, rugged hills, extending from Mounts Singapore and Hunter on the east, to the Darby ridge, dropping to the ocean on the west, and among which the tops of the higher peaks of Latrobe, Vereker, Leonard, and Oberon stand out against the sky. Snake Island, at the eastern entrance to the Inlet, can just be made out, while Granite and Bennison Islands, which, like Doughboy, are the homes of the Mutton-bird, can also be seen. Soon after passing Doughboy, the broad track which runs up the extreme northern slope of the Vereker Range, and along which we were soon to travel, could easily be made out.

Except while in the channels, the Inlet was seen to be so shallow that the shells and weeds on the sandy bottom could be clearly seen.

Swans were absent until we approached the Promontory, where large numbers were seen congregated on the mud-banks, now being exposed by the falling tide, and others flying, single file, across the water to join them. Many were still moulting, and, when disturbed by our boats, could only flap along the surface, leaving a long trail of feathers in their wake.

Closely approaching the landing-place at the south-west corner, the anxiety exhibited by our boatmen was communicated to ourselves, and we soon saw that the possibility of landing dry-shod was out of the question. Every precaution was taken to evade the shallows, so as to run the boat as close

in to shore as possible, and the long experience of our guide, Mr. W. J. Cripps (who, by the way, has only recently been appointed ranger in charge of the Inlet), was then appreciated. Notwithstanding all the care and foresight of our guide, however, we grounded some distance from the shore, and had to choose between landing at once or waiting until the tide rose again about midnight. The former course was at once agreed upon, and the "flatty" put into commission. With its help the two ladies and some of the luggage were transferred as close inshore as possible, but not near enough to enable them to land without wading.

The "flatty" had grounded on the mud-bank so far in that it was impossible to make further use of it, and there was nothing left to the others but to wade in and carry such of the luggage as was immediately required. The novelty of the situation afforded considerable amusement, and was, in fact, regarded as part of the programme. As each one did his fair share of hard work, we soon had everything required safely ashore. At this spot a jetty has since been erected by the committee of management, which will enable visitors to land under much more comfortable circumstances.

Closely adjacent is one of the two rest-houses recently built in the Park. This is situated in a convenient place commanding an extensive view over the Inlet. It is constructed of galvanized iron, and measures 20 feet by 14 feet, and is divided into two compartments, the smaller of which is furnished with four sleeping bunks, while the larger one is provided with a large fireplace, table, and other conveniences. Our party were its first occupants, and its suitability for such purposes met with general approval.

While the tents were being erected, our evening meal was being prepared, and we were soon as comfortably established as we could wish. The novelty of our surroundings, of course, appealed to the unexperienced, and was enhanced in the stillness of the evening by the frequent calls of the Boobook Owl, and the peculiar clicking noise—compared to the pattering of rain-drops falling among the leaves—made by the thousands of Mangrove Crabs which line the shore at low tide.

Friday, 27th.—Soon after daylight we were all astir, and, after a dip in the Inlet, packed everything ready for removal to our Vereker camp. We had scarcely finished breakfast when the pack-horses arrived in charge of our camp-assistant, Mr. H. MacLean, and shortly after a start was made for the Vereker Range, about three miles away.

Our route took us through the thickly-timbered, scrub-covered hills lying between the northern end of the range and

the Inlet. The timber here is chiefly small eucalypts and exceptionally well-grown Honeysuckles, *Banksia serrata*, intermixed with the Grass-tree, *Xanthorrhœa australis*, heathy shrubs such as *Leptospermum*, *Epacris*, *Hakea*, &c., and smaller plants of various kinds. As the northern end of the range is approached the banksias predominate, and, with the grass-trees, give to this locality quite a park-like appearance.

During our walk the variety of flowering plants excited the enthusiasm of the botanical members of our party, who were already promising themselves a good time.

Birds were fairly numerous, and were both seen and heard. Both the Black Cockatoo, *Calyptorhynchus funereus*, and Sulphur-crested Cockatoo, *Cacatua galerita*, which, a few weeks earlier, were busily engaged in tearing open the long flower-spikes of the grass-trees in search of caterpillars, were noted. Wattle-birds were very common everywhere among the banksias, while the Wedge-tailed Eagle, King Parrot, Crimson Parrot, *Platycercus elegans*, Pallid Cuckoo, Black-faced Cuckoo-Shrike, *Granculus mclanops*, Grey Bell-Magpie, *Strepera versicolor*, Honey-eaters, White-shafted Fantail, *Rhipidura albiscapa*, and a pair of Bronze-wing Pigeons, *Phaps chalcoptera*, were among those seen. We, however, missed our old friend the Magpie, and, rather strange to say, did not see a single specimen on the Vereker.

Although wallabies are fairly plentiful in this locality, only two were seen.

A couple of miles' walk brought us on to the broad track which runs to the top of the range, and past the site chosen for our camp. As we ascended the track became steeper, and frequent halts were made to admire the fine views. The best general view, however, and probably the most extensive on the Promontory, was obtained from a small saddle a short distance from our camp. From this spot, at an altitude of considerably over 1,000 feet, an excellent panoramic view of the whole of the northern end of the Promontory is obtained. Overlooking the extensive flat walled in on the south by Mount Leonard and the Darby Hills and on the east by Mount Vereker and its numerous spurs, we could make out the position of the Darby River, winding about from the foot of Mount Vereker, with Shellback Island clearly defined opposite its mouth. From there the view extends northward along the isthmus and over the hundreds of acres of pure white and ever-shifting sand-dunes near Yanakie, to Shallow Inlet and Waratah Bay, with Cape Liptrap in the dim distance. Looking north, the whole of the Inlet, with its three granite islands—Doughboy, Bennison, and Granite—and extensive low-lying

and partly submerged flat islands and mud-banks, lay before us, backed by the Hoddle Range and other hills behind Foster, Toora, &c., on the mainland. On the east, and still from the same point, the view extends over the extensive area of flat—and in places marshy—country to Mounts Roundback, Hunter, and Singapore and the ocean beyond, on the extreme north-east point of the Park, with the low-lying Snake Island appearing as a faint line between Singapore and Port Welshpool.

Reaching the site of our camp, where our dining tent had already been erected, we were soon actively engaged with the erection of the other tents and preparing for our comfort during our stay, while the pack-horses returned for another load. Unfortunately, in our anxiety to get our camping material along by the first load no thought was given for our next meal, and our provisions were, of course, left behind. The long climb up the range with heavy loads did not encourage the horses to hurry on their next trip, consequently what should have formed our mid-day lunch arrived in time for afternoon tea. The delay, however, only rendered our appetites keener, and we had ample time to afterwards explore our more immediate surroundings.

A little beyond and above our camp an enormous mass of granite boulders forms the highest point of the range (1,654 feet). On both the eastern and western slopes great weathered masses of rock are exposed, while isolated boulders, long since detached from their beds, lie scattered along the base. Continuing along the well-worn timber track, we were soon among the big timber. The range here is nearly cut through by two densely overgrown, deep fern gullies, one draining into the flats on the western side, the other only separated by a comparatively narrow, low saddle, winding about through a tangled mass of vegetation and huge boulders, and ultimately finding its way to Barry's Creek, on the eastern side. In this sheltered portion of the range the excellent examples of the White Mountain Ash, *Eucalyptus regnans*, and Yellow Stringybark, *E. Muelleriana*, were admired. It was here the heavy, straight-grained posts used for the main fence were obtained.

The gullies remind one of those in many parts of Gippsland. Large tree-ferns, *Dicksonia antarctica* and *Alsophila australis*, line the bottom of the gully, while a dense mass of tall bracken, wire-grass, blanket-tree, &c., covering the fallen logs and branches, makes it difficult to penetrate into them. On the sheltered slopes is a dense forest of tall saplings of hazel, musk, blanket-tree, &c., beneath which are damp, decaying logs and tree-fern butts clothed with masses of small seedling ferns—*Polypodium*, *Hymenophyllum*, &c.

During the short search in the bed of the gully and under the logs and stones, a few land shells, insects, and one or two land planarians were taken. The well-known Sand-hopper, *Talitrus*, were numerous under every log, while some small fresh-water crustaceans were taken from the small stream. On our way back to camp most of the party indulged in log-turning, and several more land planarians, beetles, land shells, &c., were collected. Two species of lizards were very common —viz., *Hinulia quoyi* and *Liolepis mustelinum*, O'Shaugh.—the latter being unusually sluggish in their movements.

Professor Ewart had availed himself of this visit to bring a supply of seeds of a number of native plants which it was desired to establish in the Park, while Mr. Pitcher brought from the Botanical Gardens several young native trees. With the help of Mr. Audas, these were planted in various localities during our excursions.

Returning to camp, ample justice was done to the evening meal awaiting us, and, after a chat round the camp fire, we retired, well satisfied with our day's work.

Saturday, 28th.—It was decided to devote the day to a visit to Lilly-pilly Gully, situated in a wild and rather inaccessible valley on the eastern side of Mount Vereker. With the exception of one member, who desired to work on the hills nearer camp, all the party started off down the eastern slope of the range near the camp. The descent through the scrub and granite boulders was rough and steep, but was soon accomplished, and an easterly course taken across the heath lands and round a spur of the range. Noticeable among the flowering plants was the Dagger Hakea, *Hakea fusciformis*, which was in full bloom, and, with isolated patches of *Leptospermum*, attracted numbers of insects, chiefly Hymenoptera and Diptera, and a few beetles, including the well-known buprestids *Cyria imperialis* and *Stigmodera macularia*. Among the butterflies the only species noticed were the well-known *Pyrameis kershawi*, *P. ilea*, *Heteronympha merope* (females), *Lycæna alsulus*, and a few *L. agricola*.

A sufficient number of plants were still in bloom to keep the botanists fairly well occupied. A little after mid-day Barry's Creek was reached, and, as the roughest part of our journey was still before us, it was considered inadvisable to push on. Two or three hours were spent along the banks of the creek, which was thickly overgrown with bracken, sword-grass, and various shrubs. Growing in the creek were splendid examples of the King Fern, *Todea barbara*, the common tree fern, the Umbrella Fern, *Gleichenia flabellata*, and the Coral Fern, *Gleichenia circinata*. The grass-trees, thickly spread over the

open slopes, were exceptionally large, and several were noticed with flower-spikes up to 15 feet high. One, growing close by the creek, showed seven crowns and four tall flower-spikes on a single butt, and it was by no means uncommon to see examples with two, three, and four crowns.

Leaving the creek, we decided to return along a spur of the range and strike the track to the camp where we had turned back the previous day. As we ascended, the views over the eastern side of the Park and the Inlet were exceptionally fine. From one point a good view of the ocean was obtained, with Cliffty Island and those adjacent standing out clearly. From here, also, we had a good view of Bull Plains, lying in close to the foot of Mount Vereker, and appearing in the distance as a well-grassed plain. The stiff climb up the steep side of the range was accomplished, but not without a severe struggle, and we reached camp about 6 o'clock.

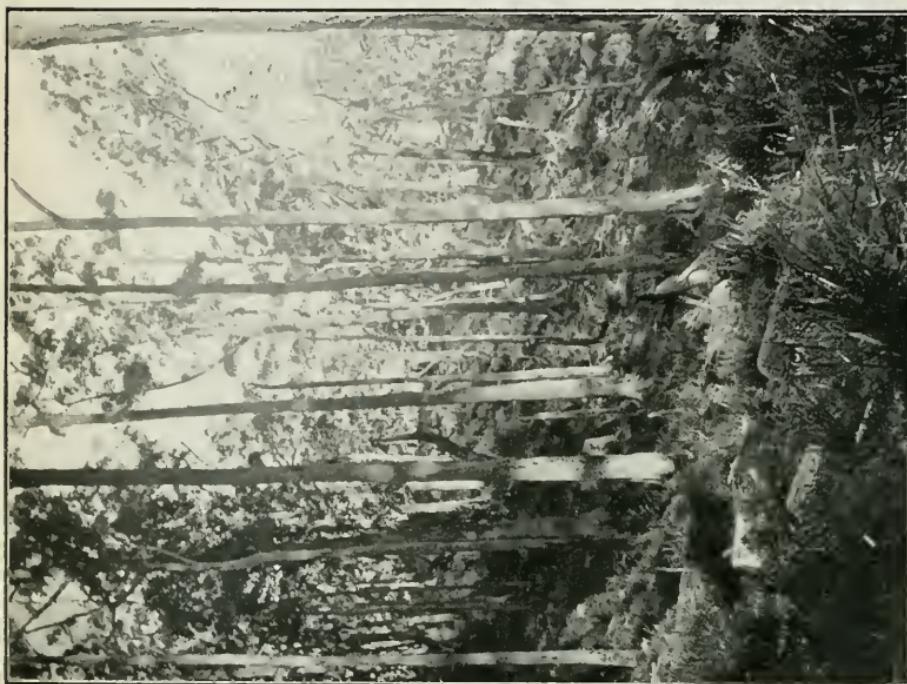
After tea we found a pleasant surprise awaiting us. Small plots of ground had been prepared on either side of the track in the vicinity of the camp, and it was arranged that each member of the party should plant one of the young trees provided. It was also insisted that each member should stake, label, and water their own particular plant. Mr. Pitcher acted as master of the ceremony, and supervised the proceedings. The leader of the excursion was invited to plant the first—a Sunshine Wattle, *Acacia discolor*—immediately opposite the camp. As each planting was completed the chief actor in each case made some appropriate remarks suited to the occasion, which was followed by three hearty cheers. In this way thirteen young native trees were planted, and the unique ceremony, which naturally occupied some time, closed with an extra volley of cheers for Professor Ewart and Mr. Pitcher, who, by their happy forethought, added so much to the enjoyment of the camp. An adjournment was then made to the camp-fire, where an impromptu programme, in which each member took a part, was carried through.

Sunday, 29th.—Leaving three of our party in camp, a visit was made to Bull Plains, a locality which appealed to us on the previous day. On this trip we struck down the range on the south of our camp, following the spur up which we climbed the previous day, and then struck off south. From the start our journey was very rough, as we had to travel through heavy undergrowth, and, for a time, among scattered boulders. Crossing the first small creek—one of the two branches which enter Barry's Creek lower down—we crossed the plain, which we found to be thickly covered with stunted shrubs of Banksia, Hakea, Epacris, and the small grass-tree, &c., with here and

there outcrops of granite. About mid-day we reached the second creek—a good, clear stream, hidden among the usual dense mass of ferns and other vegetation. Here we decided to lunch and put in the two or three hours available in exploring the locality, while Professor Ewart and Mr. Audas followed their usual programme of seed-planting. During lunch we were much amused with the performance of two lizards, *Hinulia quoyi*, which, without the slightest indication of fear, climbed on to the lap of one of the party and caught numbers of flies as they settled. A good example of the *Hepialus eximea*—a green moth whose larvæ feed in the wood of small eucalypts, &c.—was taken, and imperfect specimens of a smaller species, *H. lignivora*, were found. At 4 o'clock we started on our return journey. It had been decided to return up the same spur which we had followed down, taking advantage of the experience gained to select a better track. After a consultation, however, it was arranged to climb the side of the range near the gap which separates Mount Vereker from the range itself. We soon found that we had set ourselves a severe task. The whole of this side of the hill had been burnt some years before, and was now a tangled mass of wire and sword-grass, fire-weed, and other scrub, which reached above our heads, with numberless logs and branches and fallen trees, which we could not see, underneath. There was, of course, no track to follow, and we were compelled to force a passage, foot by foot, up the very steep slope. Mr. Audas's strength and weight had the best effect, and he was unanimously appointed leader. Slowly forcing our way through, and at times walking along the trunk of some fallen giant, we finally reached the top of the range. Here our troubles were by no means ended, as the scrub was almost as dense as that we had just passed through. With perseverance, and many halts, however, we finally struck a narrow cattle-track, and soon after reached the head of the gully not far from camp. Everyone was thoroughly tired, but, after all, did not regret their rough experience.

Monday, 30th.—This morning we were all astir earlier than usual. It was our last morning on the Vereker, and our camping material and baggage had to be prepared ready for removal to the Inlet. The programme for the day provided for a visit to the Darby, a seven-mile walk, and back to the rest-house at the Inlet. The tents were soon dismantled, and everything placed in readiness for removal, and after a good breakfast, and three hearty cheers to mark our enjoyable visit, the whole party were soon on their trip across the heath-covered flats to the Darby. Three of our botanists elected to

PLATE X.



Photo, by MISS F. BAGE.

TALL TIMBER—VEREKER RANGE.



Photo, by MISS F. BAGE.

FOREST SCENE—VEREKER RANGE.

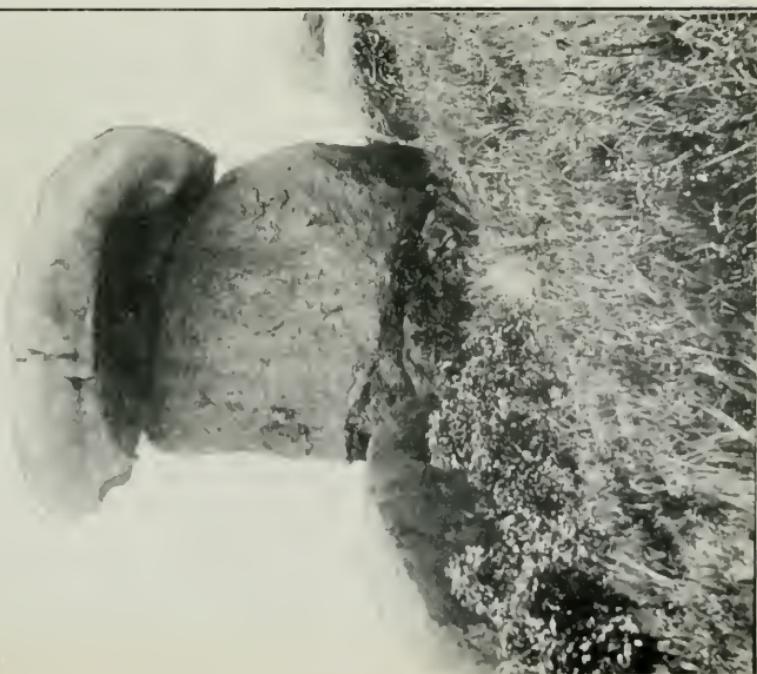
PLATE XI.



Photo, by J. A. KERSHAW.

LOOKING NORTH FROM BULL PLAINS,

Hakea pranginiformis in foreground.



Photo, by A. J. ROBERTSON.

GRANITE ROCKS—VEREKER RANGE.

VIEWS IN NATIONAL PARK, WILSON'S PROMONTORY.

cross the marshy country by a short cut, while the others followed a well-defined track. It was while crossing these flats some three years ago that the first example of the rare Ground Parrot, *Pezoporus terrestris*, was noticed; others were seen about the same time on the eastern side of the range, while one was disturbed here during our trip. The interesting little Emu-Wren is also common on these flats, and, in fact, ranges over the heathy lands throughout the Park.

About two miles and a half from the Darby the track enters what was at one time a thickly-timbered flat, extending across to the tea-tree covered sand-dunes which margin the ocean beach. Most of the timber, which consisted principally of fair-sized eucalypts, with a few scattered Blackwoods, has been ringed, only their whitened skeletons remaining to show what once had been.

Only a few years ago the Koalas or Native Bears were numerous, and could be seen here at any time. Wallabies, Dingoes, and the introduced Hog Deer, were also common, but are now replaced by the Fox. Birds are still fairly numerous, the most noticeable being Crows, Magpies, Mud-Larks and the Sulphur-crested Cockatoo. A Wedge-tailed Eagle's nest still stands in a large gum-tree close to the track, and the White-bellied Sea Eagle, which also nests in the park, is occasionally seen here.

Approaching the entrance to the park we passed a small reedy swamp, situated among the old sand-dunes. This is the home of numerous birds, including the Bald Coot, Moor-Hen, Black-throated Glebe, Black Duck, Reed Warbler, Blue Wren, and occasionally the Native Companion, while numberless Starlings roost among the reeds.

The Darby River, which forms the north-western boundary of the Park, was reached before mid-day, and after a swim in the ocean, we had lunch in the newly-erected Trustees' cottage, nicely situated at the foot of a steep, scrub-covered sand-hill adjacent to the river. Close by is the second rest-house, while a little further on is the Ranger's cottage, commanding an excellent view of the adjacent hills.

The fence, which extends from Corner Inlet to the Darby, crosses the river here, and, continuing over the steep sand-hill, terminates on the rocky ocean beach. Within the Park were seen some of the animals recently introduced, consisting of two Kangaroos, two species of Wallabies (one of which was brought from Flinders Island in Bass Strait), and two Emus.

After an interesting ramble along the shore, we left the Darby at 4.30 p.m. and reached the rest-house at the Inlet at 6.45 p.m., a walk of $6\frac{1}{2}$ miles.

Most of our luggage having been brought from our camp, the tents were soon erected, and we sat down to enjoy a well-earned dinner. During the evening the party formed itself into serious meeting. Several interesting speeches were delivered and responded to, followed by the usual musical accompaniment, rendered in a manner unprecedented in the National Park. In addition to those of a personal character, both the Field Naturalists' Club and the Trustees of the National Park were honoured. In referring to the Club, Mr. Williamson spoke highly of the valuable work accomplished by the members, and the importance of extended field excursions such as that we were then enjoying. Mr. Shephard, in an earnest speech, congratulated the Trustees of the Park on the able manner in which they were managing the Park, the improvements already effected, and the arrangements made for the comfort of visitors. He said the Trustees deserved the greatest possible encouragement, and asked that every opportunity should be taken to make known the splendid advantages of the Park, both as a sanctuary for the native fauna and flora, and as a delightful resort for tourists and others.

Professor Ewart and Mr. Kershaw responded on behalf of the Trustees, and explained some of the improvements which it was intended to carry out in the near future. Mr. Kershaw gave an outline of the movement which led up to the permanent reservation of Wilson's Promontory, tracing its history from the early visit of Messrs. Lucas and Gregory, and said the credit of initiating the movement and keeping it prominently before the public was due to the Club.

After an enjoyable evening, the company broke up to prepare for an early start homewards in the morning.

Tuesday, 31st.—All were astir at 4.30 a.m., and at 6 o'clock were once more aboard, and with a favourable tide, accompanied by the exceptional weather with which we had been favoured throughout the trip, started off towards Doughboy Island.

Here the whole party landed, and had ample time to thoroughly explore every corner of it. The island is small, and in favourable weather a fairly easy landing can be made at almost any part of it, though the two small sandy beaches, one on the east side and the other on the west, are usually selected. At one time a building stood on the eastern side of the island, the remains of which were still visible. This accounted for a number of garden plants, such as the Arum Lily, Periwinkle, &c., which had been introduced, and which were thriving right down to the narrow beach. No less than fifty species of plants were noted, a list of which is appended.

As already stated, this island forms one of the breeding places

of numberless Mutton-birds, whose burrows occupy the greater part of the island. Few of our party had ever seen one of these birds, so the opportunity was taken to remove one, together with its egg, from its burrow for inspection. Our visit here formed a pleasant termination to a most enjoyable trip, and we left it with regret.

Steering a course for Port Franklin, we had an opportunity of seeing the mud-flats now partly exposed by the falling tide, and the numerous birds, such as Swans, Cormorants, Curlews, Gulls, &c., which congregate there, and the swarms of Mangrove Crabs which line the banks of the river. On landing we found a good lunch awaiting us, after which the horse-tram conveyed ourselves and luggage to Bennison, and the train completed our trip. The total cost of our five days' trip, including the railway fare, amounted to £2 4s. 8d. per member.

During the excursion a large number of photographs were taken by different members of the party, four of which, showing characteristic features of the portion of the Park visited, are reproduced herewith.

For those who wish to learn more about the Park and its contents, reference may be made to previous articles in the *Naturalist*, viz.:—The history of the movement, in vol. xxi. (January, 1905); report of the first camp-out (with four illustrations), vol. xxii. (April, 1906); first botanical survey (with map), vol. xxv. (January, 1909); second botanical survey, vol. xxvi. (January, 1910); and third botanical survey, vol. xxvii. (January, 1911).

ZOOLOGY.—BY J. A. KERSHAW.

The zoological results of the trip were very limited, and but few additions can be made to the list already published, although many of those already recorded were taken.

Few additional birds were noted, and as it is intended to publish later a list of those seen at various times throughout the Park, these are not being dealt with here. I am, however, indebted to Mr. H. B. Williamson for a list of those noted by him during the trip.

Mr. J. Shephard contributes a note on Pond Life.

MOLLUSCA.—LAND SHELLS.

Chloritis victoriae, Cox
Endodonta albanensis, Cox

| *Helicarion cuvieri*, Feruss

Coleoptera—

Lissotus, sp.

Cyria imperialis, Don

Stigmadera mitchelli, Hope
,, *kerremansi*, Blkb.

Coleoptera—

Cisseis duodecemmaculata, Fabr.

Melobasis propinqua, Lap. et Gory

Monocrepidius cordieri, Le Guill.
Telephorus nobilitatus, Er.

INSECTS.

Coleoptera—

- Pseudolychus haemopterus, Gn.
 Homotrysis, sp.
Apasis howitti, Pasc.
Lepispilus sulcicollis, Boisd.
Meneristes australis, Boisd.
Adelium orphana, Pasc.
 " *pustulosum*, Blkb.
 " *tenebrioides*, Erich.
Pelorrhinus argentosus, Gyll.
Acantholophus subulatus, Macl.
Xystrocera virescens, Newm.
Athemistes aethiops, Pasc.

Coleoptera—

- Pytheus jugosus*, Newm.

Orthoptera—

- Gonolabis woodwardi*, Burr.
Calolampra irrorata, Fabr.
Gryllacris molineusiana, Tepp.
Tinzea albosignata

Hemiptera—

- Gminates australis*, Erich.
Pseudopontilius australis, Walk.
Stauralia compuncta, Berg.

Diptera—

- Trypetia cluana*, Walk.

POND LIFE.—BY J. SHEPHARD.

Owing to the elevated position of the camp, and the ground sloping steeply, there were no ponds near, and the gullies contained only very small streamlets. A number of crustaceans were collected from one of the gullies, which Mr. J. Searle has identified as *Gammarus haasei*, an amphipod described by the late Mr. O. A. Sayce.

During the flying visit to the Darby River a gathering was made, among which Mr. Searle found that the following could be identified after the journey to Melbourne:—

Cladocera—

- Alonella*, sp.
Camptocercus, sp.
Chydorus globosus
Ilyoeglyptus sordidus

Copepoda—

- Cyclops australis*
Attheyella australica

Amphipoda—

- Atyloides gabrieli*, Sayce.

BOTANICAL REPORT.—BY ALFRED J. EWART, D.Sc., F. PITCHER,
H. B. WILLIAMSON, AND J. W. AUDAS, F.L.S.

The party was well provided with botanists, and this enabled a good deal of botanical work to be done. The main object of this trip, so far as the National Herbarium was concerned, was to fulfil a promise made long ago to establish as many native plants as possible in the National Park, particularly those which are in danger of extinction. During the present trip, however, owing to the difficulty of obtaining material, it was found necessary to leave the planting of rare native plants for a future occasion, mainly owing to the difficulty of obtaining seeds or living material at short notice. The reason for not commencing planting before was that it was thought desirable to complete the census of the Park before introducing any plants from other regions of Victoria. The fact that during the present visit only seven additional records have to be added to the previous list of 600 shows that the census may be regarded as comparatively complete, and, since lists will be kept of all plants introduced, no confusion is likely to arise in the future.

After deciding to join the excursion to the National Park, Mr. Pitcher thought it would be a good opportunity to take a few native trees, not already recorded as being found there, and have them planted by the members of the party. With the sanction of the Curator of the Botanic Gardens, eighteen plants from the Gardens nursery stock were selected for the purpose. These consisted of six Sunshine Wattle, *Acacia discolor*, six Golden Wattle, *A. pycnantha*, and six Mahogany Eucalypt, *Eucalyptus botryoides*. The plants were carefully packed, and, notwithstanding the rough handling of the package during transit, they were found to be in good order when taken out. The planting of thirteen of these plants was carried out on the evening of Saturday, the 28th December, as referred to by the leader, Mr. Kershaw, in his report. Three more of the trees were planted near the rest-house prior to our embarking on the return journey, and the remaining two were planted on Doughboy Island on the way back. It should be specially noted that the risk attendant on planting trees in the height of summer was quite foreseen, but it was taken only in the hope of some showers of rain occurring during January to sustain the plants over the hot period. Although the precaution was taken to give the plants a good watering before we left, it is quite possible that the continuous dry weather which has since prevailed may have proved disastrous to most, if not all, of the plants.* One out of many of the numerous interesting and desirable plants which should be introduced is the only palm-tree found indigenous to Victoria—viz., *Corypha australis*. From its being found in East Gippsland, and from the luxuriant manner in which it thrives in cultivation in the Botanic Gardens, there should be no difficulty in establishing this shapely and beautifully-foliaged palm in many of the gullies and valleys of the Promontory.

In addition, the seeds of a number of Victorian plants not recorded from the Park were obtained, mainly from the Botanical Gardens and from Messrs. Brunning, and were planted at various points. In most cases each packet of seed represented at least ten different plantings in suitable selected localities. These localities were sheltered spots in the gullies of the Vereker Range, on the peaks such plants as *Eucalyptus alpina*, along the tracks to Barry's Creek such plants as *Callitris*, *Hardenbergia*, *Kennedyia*, *Melaleuca*, along Barry's Creek and neighbouring watercourses *Pittosporum*, *Tristania*, *Lomatia*, &c. The eucalypts were, for the most part, planted on the north and west sides of the Vereker, along the foot of

* During a visit to this locality on the 25th February I found that, with the exception of two plants, all appeared to be thriving.—J. A. K.

the Vereker at Corner Inlet, and towards the mouth of the Darby River. A label was attached to each seed plot until the supply gave out, and, as most of the plantings were done during the day's march, it was not possible to keep a precise record of the locality of each separate bed. The appearance of the plants later on will, however, be the best evidence of their establishment. The full list of the seeds planted is appended :—

LIST OF VICTORIAN SEEDS PLANTED AT THE NATIONAL PARK, WILSON'S PROMONTORY, DECEMBER, 1912.

<i>Acacia acinacea</i> , Lindl.		<i>Eucalyptus piperita</i> , Smith
„ <i>discolor</i> , Willd.		„ <i>polyanthemos</i> , Schauer
„ <i>linearis</i> , Sims		„ <i>rostrata</i> , Schlech.
„ <i>linifolia</i> , Willd.		„ <i>sideroxylon</i> , Woolls
„ <i>obtusata</i> , Sieber		„ <i>Sieberiana</i> , F. v. M.
„ <i>penninervis</i> , Sieber		„ <i>Stuartiana</i> , F. v. M.
„ <i>prominens</i> , A. Cunn.		„ <i>tereticornis</i> , Smith
„ <i>pycantha</i> , Benth.		<i>Callistemon coccineus</i> , F. v. M.
„ <i>verniciiflora</i> , Cunn.		„ <i>salignus</i> , D. C.
<i>Actinotus helianthi</i> , Labill.		<i>Callitris robusta</i> , R. Br.
<i>Eucalyptus alpina</i> , Lindl.		<i>Dodonaea triquetra</i> , Wendl.
„ <i>botryoides</i> , Smith		<i>Hardenbergia monophylla</i> , Benth.
„ <i>pauciflora</i> (<i>coriacea</i>), Sieber		<i>Kennedya rubicunda</i> , Vent.
„ <i>corymbosa</i> , Smith		<i>Lomatia longifolia</i> , R. Br.
„ <i>cladocalyx</i> (<i>corynocalyx</i>),		<i>Melaleuca hypericifolia</i> , Smith
„ F. v. M.		<i>Nephelium leiocarpum</i> , F. v. M.
„ <i>haemastoma</i> , Smith		<i>Pittosporum undulatum</i> , Vent.
„ <i>hemiphloia</i> , F. v. M.		<i>Pomaderris vacciniifolia</i> , Reiss.
„ <i>leucoxylon</i> , F. v. M.		<i>Brachychiton populneum</i> , R. Br.
„ <i>longifolia</i> , Smith		(<i>Sterculia diversifolia</i> , G. Don)
„ <i>melliodora</i> , Cunn.		<i>Tristania laurina</i> , R. Br.

The plants not previously recorded found during the present trip are given below, with the precise localities :—

<i>Arthropodium paniculatum</i> , R. Br.	...	...	Vereker Range
<i>Cladium Mariscus</i> , R. Br.	...	...	Flat near Vereker Range
<i>Haloragis Brownii</i> , Sch.	...	...	Flat near Vereker Range
<i>Myriophyllum pedunculatum</i> , Illok. f.	...	...	Flat near Vereker Range
<i>Schoenus axillaris</i> , Poir.	...	...	Flat near Vereker Range
<i>Trachymene heterophylla</i> , F. v. M.	...	...	Flat near Vereker Range

During the return from Corner Inlet a landing was made upon Doughboy Island. During a previous visit it had been noted that, owing to the former presence of an inhabitant on the island, a number of garden plants—Periwinkle, Arum Lily, &c.—had firmly established themselves on the island. During the present visit the botanists of the party scoured every corner of the island and made a complete collection of every flowering plant growing on it. It will be seen from the list that, although a few naturalized aliens have obtained a firm foothold, the native flora is still greater in numbers, and it will be of interest to see in future years whether the same

relation holds good, or, if not, which plants survive in what must be so intense a struggle for existence on this small, exposed island.

LIST OF PLANTS FOUND ON DOUGHBOY ISLAND, DECEMBER, 1912.

- | | |
|---|--|
| 1. <i>Acacia melanoxylon</i> , R. Br. | 26. <i>Mesembryanthemum æquilaterale</i> , Haworth |
| 2. <i>Anagallis arvensis</i> , L. | 27. <i>Myoporum insulare</i> , R. Br. |
| 3. <i>Aspidium aculeatum</i> , Sw. | 28. <i>Oxalis corniculata</i> , L. |
| 4. <i>Banksia integrifolia</i> , L. | 29. <i>Parietaria debilis</i> , G. Forst. |
| 5. <i>Bulbine semibarbata</i> , Haworth | 30. <i>Pelargonium australe</i> , Willd. |
| 6. <i>Calandrinia calyprata</i> , Hook. f. | 31. <i>Pittosporum undulatum</i> , Vent. |
| 7. <i>Carduus lanceolatus</i> , L. | 32. <i>Poa annua</i> , L. |
| 8. <i>Chenopodium glaucum</i> , L. | 33. " <i>cæspitosa</i> , G. Forst. |
| 9. <i>Correa alba</i> , Andrews | 34. <i>Polypodium pustulatum</i> , G. Forst. |
| 10. <i>Cyathodes acerosa</i> , R. Br. | 35. <i>Poranthera microphylla</i> , Brongn. |
| 11. <i>Deyeuxia Forsteri</i> , Kunth. | 36. <i>Pteris aquilina</i> , L. |
| 12. <i>Dianella tasmanica</i> , Hook. f. | 37. " <i>incisa</i> , Thunb. |
| 13. <i>Dichelachne sciurea</i> , Hook. f. | 38. <i>Richardia africana</i> , Kunth. |
| 14. <i>Dichondra repens</i> , R. & G. Forst. | 39. <i>Rumex Brownii</i> , Campd. |
| 15. <i>Eucalyptus paludosa</i> , Baker
(leaves only) | 40. <i>Sagina apetala</i> , L. |
| 16. <i>Erechites arguta</i> , D. C. | 41. <i>Scirpus cartilagineus</i> , Spreng. |
| 17. <i>Galium umbrosum</i> , Soland. | 42. " <i>nodosus</i> , Rottb. |
| 18. <i>Geranium dissectum</i> , L. | 43. " <i>riparius</i> , Spreng. |
| 19. <i>Gnaphalium japonicum</i> , Thunb. | 44. <i>Selliera radicans</i> , Cav. |
| 20. " <i>luteo album</i> , L. | 45. <i>Solanum aviculare</i> , G. Forst. |
| 21. <i>Hydrocotyle hirta</i> , R. Br. | 46. " <i>nigrum</i> , L. |
| 22. <i>Juncus communis</i> , E. Meyer | 47. <i>Sonchus oleraceus</i> , L., var. <i>asper</i> |
| 23. <i>Lobelia anceps</i> , L. | 48. <i>Tillaea Sieberiana</i> , Schult. |
| 24. <i>Marchantia polymorpha</i> , L. | 49. <i>Urtica incisa</i> , Poir. |
| 25. <i>Melaleuca ericifolia</i> , Sm. | 50. <i>Vinca major</i> , L. |

During each day's march notes were kept of the plants observed in flower, since in that way it will ultimately be possible to see whether any pronounced difference exists between the times of flowering in the National Park and on the mainland. Seasonable variations in the time of flowering are indicated in several cases by the fact that plants not noted in flower on previous visits at this time were found in flower during the present excursion. A large proportion of the following list is due to the careful notes kept by Mr. Williamson.

The following plants were found in flower; those marked with an asterisk were not seen in flower on previous excursions :—

- Acacia verticillata*, Willd.
- Acaena ovina*, Cunn.
- " *sanguisorbae*, Vahl.
- Ajuga australis*, R. Br.
- Alyxia buxifolia*, R. Br.
- Amperea spartioides*, Brong.
- Apium prostratum*, Labill.
- **Arthropodium paniculatum*, R. Br.
- Atriplex cinerea*, Poir.
- Australina Muelleri*, Wedd.
- Banksia marginata*, Cav.

- Banksia serrata*, L.
- Bauera rubioides*, Andrews
- Billardiera scandens*, Sm.
- Boronia parviflora*, Sm.
- Brachycome seapiformis*, D. C.
- Brunonia australis*, Sm.
- Burchardia umbellata*, R. Br.
- Bursaria spinosa*, Cav.
- Cakile maritima*, Scop.
- Caladenia carnea*, R. Br.
- Cardamine dictyosperma*, Hook. f.

- Carex cæspitosa*, L.
 „ *paniculata*, L.
Cassinia aculeata, R. Br.
Cassysta glabella, R. Br.
 „ *pubescens*, R. Br.
Casuarina distyla, Vent.
**Chenopodium glaucum*, L.
**Cladium Mariscus*, R. Br.
 „ *schœnoides*, R. Br.
Clematis microphylla, D. C.
Comesperma calymega, Labill.
 „ *ericinum*, D. C.
Convolvulus erubescens, Sims
Correa alba, Andrews.
 „ *speciosa*, Andrews
Cynoglossum australe, R. Br.
Daucus brachiatus, Sieber
Deyeuxia Fosteri, Kunth.
Dianella longifolia, R. Br.
 „ *tasmanica*, Hook. f.
Dichondra repens, R. & G. Forst.
Dillwynia ericifolia, Sm.
 „ *floribunda*, Sm.
Diplarrhena Moræa, Labill.
**Dipodium punctatum*, R. Br.
Drosera binata, Labill.
Echinopogon ovatus, Beauv.
Epacris impressa, Labill., var. *rosea*
 „ *lanuginosa*, Labill.
 „ *microphylla*, R. Br.
Epilobium juncceum, Forst.
Erechtites arguta, D. C.
Erythræa australis, R. Br.
Eucalyptus amygdalina, Labill.
Euphrasia collina, R. Br.
Exocarpus stricta, R. Br.
Festuca littoralis, Labill.
Gahnia psittacorum, Labill.
Gastrodia sesamoides, R. Br.
Geranium dissectum, L.
Gleichenia flabellata, R. Br.
Gnaphalium japonicum, Thunb.
 „ *luteo-album*, L.
Gompholobium Huegelii, Benth.
 „ *minus*, Sm.
Goodenia ovata, Sm.
Hakea pugioniformis, Cav.
**Haloragis Brownii*, Sch.
 „ *tetragyna*, Hook. f.
Helichrysum apiculatum, D. C.
 „ *Baxteri*, Cunn.
 „ *ferrugineum*, Less.
 „ *leucopsidium*, D. C.
 „ *obtusifolium*, Sond. and
 F. v. M.
 „ *scorpioides*, Labill.
 „ *semipapposum*, D. C.
Heleocharis acuta, R. Br.
Hibbertia acicularis, F. v. M.
- Hibbertia Billiardieri*, F. v. M., var.
 monadelpha
 „ *procumbens*, D. C.
Hovea heterophylla, Cunn.
Hydrocotyle hirta, R. Br.
 „ *laxiflora*, D. C.
Hypericum japonicum, Thunb.
Hypolæna fastigiata, R. Br.
 „ *lateriflora*, Benth.
Juncus communis, G. Mey.
 „ *pauciflorus*, R. Br.
 „ *planifolius*, R. Br.
Lagenophora Billardieri, Cass.
Laxmannia sessiliflora, DCne.
Lepidium ruderale, L.
Lepidosperma elatius, Labill.
Leptospermum myrsinoides, Sch.
 „ *scoparium*, R. and G.
 Forst.
Leucopogon virgatus, R. Br.
Lobelia anceps, L.
 „ *gibbosa*, Labill.
Lomatia Fraseri, R. Br.
Lotus australis, Andrews
Luzula campestris, L.
Melaleuca squarrosa, Don
Mentha australis, R. Br.
Mesembryanthemum æquilaterale, Haw.
Mesomelæna sphærocephala, Benth.
Microseris Forsteri, Hook. f.
Microtis porrifolia, R. Br.
Mitrasacme polymorpha, R. Br.
**Myriophyllum pedunculatum*, Hook. f.
Olearia ciliata, F. v. M.
 „ *glutinosa*, Benth.
 „ *ramulosa*, Benth
 „ *stellulata*, D. C., var. *lyrata*
Oxalis corniculata, L.
Parietaria debilis, G. Forst.
Patersonia glauca, R. Br.
 „ *longiscapa*, Sweet
 „ *glabrata*, R. Br.
Pelargonium australe, Willd.
Persoonia juniperina, Labill.
Pimelea humilis, R. Br.
 „ *ligustrina*, Labill.
 „ *phylicoides*, Meiss.
Poa cæspitosa, G. Forst.
Poranthera microphylla, Brong.
Prasophyllum australe, R. Br.
 „ *fuscum*, R. Br.
 „ *patens*, R. Br.
Prostanthera lasianthos, Labill.
Restio tetraphyllus, Labill.
Rhagodia Billardieri, R. Br.
Sagina apetala, L.
Salicornia australis, Soland.
Sambucus Gaudichaudiana, D. C.
Samolus repens, Pers.

**Scævola Hookeri*, F. v. M.
 **Schœnus axillaris*, Poir.
Scirpus cartilagineus, Spreng.
 „ nodosus, Rottb.
Sebaea ovata, R. Br.
Senecio australis, Willd.
 „ odoratus, Horn.
 „ velleyoides, Cunn.
Solanum aviculare, G. Forst.
 „ nigrum, L.
Spergularia rubra, J. and C. Presl.
Sphaerolobium vimineum, Sm.
Sprengelia incarnata, Sm.
Stackhousia linearifolia, Cunn.
 „ spathulata, Sieber
 „ viminea, Sm.
Stellaria flaccida, Hook.
 „ pungens, Brong.
Stipa setacea, R. Br.
 „ teretifolia, Steud.
Styllidium graminifolium, Swartz
Stypandra cespitosa, R. Br.
Succeda maritima, Dum.
Swainsona lessertiifolia, D. C.

Tetrarrhena juncea, R. Br.
Tetrapetala pilosa, Labill.
Thelymitra ixioides, Swartz
Thomasia petalocalyx, F. v. M.
Thysanotus tuberosus, R. Br.
Todea barbata, Thunb.
**Trachymene heterophyllya*, F. v. M.
Tricoryne elatior, R. Br.
Urtica incisa, Poir.
Utricularia dichotoma, Labill.
 „ lateriflora, R. Br.
Veronica Derwentia, Litt.
 „ notabilis, F. v. M.
Villarsia reniformis, R. Br.
Viminaria denudata, Sm.
Viola hederacea, Labill.
Wahlenbergia gracilis, A. D. C.
Xanthorrhœa australis, R. Br.
 „ minor, R. Br.
Xanthosia pilosa, Rudgr.
Xerotes longifolia, R. Br.
Xyris gracilis, R. Br.
Zieria Smithii, Andrews

PHYSIOGRAPHICAL NOTES.—BY A. J. ROBERTSON, M.Sc.

The geology of the National Park was dealt with in some detail by Dr. G. B. Pritchard, F.G.S., in the report of the first "camp-out" of the Club, in December, 1905 (*Vict. Nat.*, xxii., p. 219), so that it is not necessary now to repeat what he has already written; but it may be of value to add a few notes dealing more particularly with the features met with during our outing at Christmas.

Briefly stated, the granite—the prevailing rock of the Promontory—has been greatly weathered, and the Vereker Range, to which our observations were confined, affords numerous instances of rounded tors, poised blocks, and rocking stones, all produced by atmospheric action. The granite consists of three primary minerals—quartz, orthoclase felspar, and biotite—with some muscovite and black tourmaline in much smaller quantities. The rock is distinctly porphyritic, the felspars being of large size, and, being thus coarse-grained, is more susceptible to weathering than a finer-grained stone would be. One or two features call for special remark. The granite bosses, besides being of general rounded outline, are not infrequently hollowed out in a curious manner—from shallow recesses to even small-sized caves. These are all due to unequal weathering of the rock masses, depending upon a slight variation in the composition of the rock in question and its position as regards the sun and the prevailing winds.

At the Darby River the formation of the aeolian limestone can be easily traced from the calcareous sand-dunes through

quartz-grain-bearing limestone to almost pure limestone below. This is due to the action of the carbonic acid in the rain falling on the dunes acting as a solvent of the calcareous shell fragments contained in the upper layers. Where the dunes have been piled up on the granite, as at the south side of the mouth of the Darby River, and where the slope of the granite surface is towards the sea, there may be seen, on exposed portions of the granite, a coating greatly resembling "boiler scale." In this case the percolating rain water, containing lime from the top layers, soaked down till it met the impervious granite. It then drained along the rock till it emerged at the lower edge of the dune, when, the water quickly evaporating, the lime was re-deposited in thin layers, as normal calcium carbonate, on the rock surface like a coating of cement.

Lying in the encircling arms of the eastern spurs of the Vereker Range is an interesting stretch of grass-tree-covered high plain—the Bull Plains. Looking at it from below—anywhere along the lower part of Barry's Creek—it presents the appearance of a huge grass-covered earthen embankment of some reservoir. Closer examination suggests that it is the remains of a small flattish hill which has been denuded without stream dissection; but, as the head-waters of Barry's Creek are now working round it between the encircling hills, in the course of time it will become what may be termed an "island plateau."

There seems no doubt that at some period of its history the Promontory was an island, with a stretch of shallow water between it and the mainland. At Yanakie, some little distance north of the dividing fence, there is a contact between the granite and the Silurian which shows the former to be the younger. Westerly and south-westerly winds seem to be the prevailing weather. The sea has banked up the sand on the submerged neck till it emerged from the water on the western side. Since then the dune formation has raised the level of the land, and is gradually pouring sand into the water on the western side of Corner Basin, which at the present time is a shallow stretch of water with, in most parts, a muddy bottom. Though there is a fair range of tide, there is practically no scour except in the neighbourhood of the eastern entrance. The sand that is blown in from the western dunes, and the mud and silt brought down by the mainland streams and those flowing north on the Promontory, are slowly but surely filling up the Basin, and it seems as if in a short time, geologically speaking, Corner Basin will be non-existent, and Doughboy and the other islands will become merely granite outliers surrounded by plain and sand-dune country.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th March, 1913. Prof. Ewart, D.Sc., Ph.D., a past president, occupied the chair, and about 40 members and visitors were present.

REPORTS.

A report of the excursion to Mitcham on Saturday, 15th February, was given by the leader, Mr. F. G. A. Barnard, who said that an interesting ramble had taken place. A couple of flower-spikes of the leafless orchid, *Dipodium punctatum*, had been seen. A few common insects had been taken, and some captures of pond-life had been made. The party got as far as the Mullum Mullum or Deep Creek, which suggested itself as a good locality for an outing in the spring.

A report of the whole-day excursion to Hanging Rock, *via* Woodend, on Saturday, 22nd February, was given by the acting leader, Mr. F. G. A. Barnard, who said that, doubtless owing to the distance from town (over fifty miles), only three members had attended. The day turned out very warm, and the party was disinclined for much exertion. However, the Racecourse Hill at Woodend was first visited, and specimens of the newly-named rock, Woodendite, obtained. Hanging Rock was reached about mid-day, and fully explored. Only well-known insects and plants were seen. The return journey was made along the south bank of the Five-Mile Creek, where more interesting plants were met with.

A report of the excursion to Deepdene on Saturday, 8th March, was given by the leader, Mr. J. Stickland, who said that there was only a small attendance of members. The ponds were in a poor condition, but a little collecting had been done. There had not been time, however, to thoroughly examine the material.

A report of the junior excursion to the Botanical Gardens on Saturday, 1st March, was given by the leader, Mr. F. Pitcher, who said that the party spent the afternoon in making an examination of the various palms and ferns in the gardens, including the collection of Victorian ferns in the classification sheds. The Nursery was visited to see the different methods of propagating and raising both ferns and palms.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. Soloman, Weston-street, Brunswick, was duly elected an ordinary member of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard drew attention to the recent destructive fires which had devastated a large area in the National Park, Wilson's Promontory. He thought that, while cattle were allowed to graze on the Promontory, these conflagrations would be periodical. He suggested that the Club should take some action in the matter, and accordingly moved—"That a strong protest be made to the Committee of Management against the further use of the National Park at Wilson's Promontory as a grazing area, on account of the danger of the destruction of the native flora."

Mr. G. Coghill, in seconding the motion, said that it was impossible to preserve the native flora while the Park was being leased for grazing purposes. Cattle want grass, and the fires had to happen.

Mr. A. D. Hardy, F.L.S., in supporting the motion, said that it must not be overlooked that the Committee of Management had already received a protest from the Club against a renewal of the grazing leases.

Professor Ewart pointed out that when the Committee took over the Park they were without funds, and it was necessary to allow grazing to continue in order to provide revenue. They would now have to consider whether it would not be better to sacrifice this revenue.

Mr. F. Pitcher asked that members be informed as to the extent of the fire.

Mr. J. A. Kershaw, F.E.S., stated that the fire extended along the whole northern end of the Promontory, down the eastern side as far as Sealers' Cove, and back into the ranges on that side. A large area of scrub land had been burnt, but, fortunately, the fire did not get into the big timber. It was difficult to form an estimate of the area destroyed, which would probably be about 20,000 acres.

Mr. A. D. Hardy drew attention to the lack of uniformity in the name applied to Corner Basin, Wilson's Promontory, which was still frequently referred to as "Corner Inlet." The latter name, he said, was now applied to the entrance of the Basin.

Dr. Hall stated that, although not the correct term geologically speaking, Corner Basin was still known locally as "The Inlet."

PAPERS READ.

1. By Mr. H. W. Davey, F.E.S., entitled "Notes on the Breeding of English Newts in Victoria."

In the absence of the author, the paper was read by Mr. J. A. Kershaw, who briefly explained the position of newts in the animal kingdom. The author stated that, though he had kept a pair of newts in an aquarium at Geelong for some years, it was not till the recent spring that eggs were laid and young hatched out. Their progress was very interesting, and they proved themselves capable of devouring enormous quantities of mosquito larvæ.

2. By Mr. F. Pitcher, entitled "Some General Remarks on Ferns, with Special Reference to Victorian Species."

The author, in a most interesting paper, referred to the position of ferns in the vegetable kingdom, and, taking a typical fern, described its various parts, &c. The distribution of ferns throughout the world and in the Australian States was briefly dealt with. Then general descriptions of the seventy-three species of Victorian ferns were given, with notes as to their habitats; also hints on the propagation and cultivation of ferns in general.

Mr. F. G. A. Barnard said that he had been interested in the group for a number of years, and had grown them with varying results. Two species, *Osmunda barbara* and *Asplenium umbrosum*, were well worth growing, and bore the roughest treatment. He had no success with *A. bulbiferum*, which was readily attacked by slugs and wood-lice, and also seemed very subject to scale. The Woodwardias were also easy to grow. He would like to know the locality of *Pteris comans*, as he had not been able to distinguish it from *P. incisa*.

Mr. C. J. Gabriel asked if the crested varieties to be seen in florists' windows could be grown and kept crested by the amateur gardener.

Professor Ewart said that all were grateful for the paper. The author had laid stress mainly on the systematic side of the subject, but there remained an enormous amount of work which could be done by field naturalists and those who like to grow and cultivate the ferns at home. Cases have been found in European ferns where the spore stage or the prothallus stage has been left out. In some cases the prothalli developed spores directly. The plants should be examined with a lens for these abnormalities. It would be interesting to know if any of our Victorian ferns have a similar mode of reproduction, or whether they develop their full life-history. Apart from one or two normal forms, the exact life-histories of Australian species had not been worked out. As regards the apical growth in tree-ferns we are absolutely ignorant. We have yet to learn the character of the apex, and the exact way in which the different organs arise from it.

Mr. Pitcher, in reply, stated that he had collected *Pteris*

comans at Trafalgar, Gippsland, which was the only locality where he had seen it. Perpetuation of the crested forms can safely be relied upon, provided they are raised from the offsets.

EXHIBITS.

By Mr. F. G. A. Barnard.—Five species of Victorian ferns; also specimens of Woodendite collected at excursion to Hanging Rock.

By Mr. F. Chapman, A.L.S.—Globigerina ooze obtained by F.I.S. *Endeavour* at 1,122 fathoms, east of Tasmania.

By Mr. F. Cudmore.—A case of fossil sharks' teeth from the Tertiary beds, Beaumaris.

By Mr. H. W. Davey, F.L.S.—Example of fasciation in Casuarina; locality, Geelong.

By Mr. C. J. Gabriel.—Marine shells from Bottle and Glass Rocks, Port Jackson, N.S.W.—*Chiton translucens*, Hedley and Hull; *Chiton coxi*, Pilsbry; *Chiton limans*, Sykes; *Chiton jugosus*, Gould; *Onithochiton quercinus*, Gould; *Ischnochiton smaragdinus*, Ang.; *Callochiton platessa*, Gould; *Lorica volvox*, Reeve; *Loricella angasi*, Ad. and Ang.

By Mr. J. A. Kershaw, F.E.S., for the National Museum.—Specimen of Giant Salamander, *Megalobatrachus maximus*, Schl.; locality, Japan.

By Mr. J. G. O'Donohue.—Woodendite and Solsbergite, from Hanging Rock, Woodend.

By Mr. F. Pitcher.—A number of fresh fronds and other examples of ferns and fern-growths, also collection of herbarium specimens of Victorian ferns, in illustration of paper.

By Mr. J. Searle.—Insects and Crustacea, collected at Mitcham excursion, 15th February, 1913.

By Mr. J. Stickland.—*Volvox globator*, collected in a pool near Kilby Lagoon, Kew.

After the usual conversazione the meeting terminated.

EXCURSION TO DEEPDENE.

ONLY a small party of members met at Deepdene on Saturday, 8th March, for the purpose of visiting the lagoons near the Yarra at East Kew in search of pond-life. As was expected, the long spell of dry weather had greatly reduced the quantity of water, at the same time rendering it more difficult of access; thus the Kilby Lagoon was unable to be worked, but a smaller pool further along the river bank afforded fair results. Here countless myriads of ostracods could be seen swimming just below the surface, about a foot from the bank. The beautiful ever-rolling spheres of Volvox were also found in considerable numbers. Both colonial and tube-building rotifers were con-

spicuous by their absence, but a few free-swimmers were taken. Protozoa were more plentiful, *Epistylis flavicans* being very numerous in large clusters, as also what we took to be *Vorticella nebulifera*, and the heliozoan form, *Actinophrys sol*. The most noteworthy captures, however, were a Suctorian with a very long stalk, which we have been unable to identify, and a flagellate animalcule, almost certainly *Spongomonas intestinalis*, Cienk. This tiny creature, which measures only about $\frac{1}{3000}$ of an inch in length, forms a large convoluted and intertwined filamentous zoocytium of a brown colour, which is large enough to be seen by the naked eye. In the surface of this the animals are embedded close together, their flagella projecting into the water. The flagella are very hard to distinguish, owing to their almost continual movement. As this was the first time we had noticed this protozoon, we felt amply repaid for the afternoon's work. Several species of desmids were also noted. Some of the members who had not visited this locality before were greatly interested in the Nardoo plant, *Marsilea quadrifolia*, Lin., which grows freely near the Kilby Lagoon.—J. STICKLAND.

EAGLE AND FOX.—Shortly after daybreak on Monday, 24th January, whilst shooting on the rocky and precipitous slopes margining the Werribee River about a mile and a half above its confluence with the Myrniong Creek, I observed a fox intently regarding me from a coign of vantage between 300 and 400 yards distant. A hurried aim resulted in the .32 calibre bullet slightly wounding the animal, which at once made off into a growth of the Shore Thistle. A large Wedge-tailed Eagle, that was circling around on widespread and motionless wings, on observing the disabled condition of the fox, immediately attacked it. The bird repeatedly swooped at its prey, and on several occasions alighted on the ground beside it with wings half open and neck extended. The fox invariably sprang upward to meet the eagle's swoop, and by this manœuvre appeared to disconcert the bird. At times, however, it avoided the eagle's onslaught by crouching low, and, when capture seemed inevitable, twisting its body out of danger by an agile movement. The eagle was attacking with great vigour and determination when the fox reached a deep, narrow ravine leading to the river, and escaped. For a short time the eagle circled over and around the spot where its quarry disappeared, and then settled down on to a rabbit that had the misfortune to break cover, and bore it, squealing and struggling, to a eucalypt growing on the opposite slope, wherein probably it had its nest, for the bird had been observed in the same tree late the previous evening.—J. G. O'DONOGHUE. 10th March, 1913.

NOTES OF A VISIT TO MOUNT PIPER.

By F. G. A. BARNARD AND C. FRENCH, JUN.

(Read before the Field Naturalists' Club of Victoria, 9th Dec., 1912.)

MOUNT Piper is an isolated hill some twelve miles north of the main divide, and lies almost due north of Melbourne. It is a conspicuous landmark, as seen from the North-Eastern railway, between Kilmore East and Broadford, or to travellers along the Sydney road in the vicinity of Kilmore.

From a distance it has much the appearance of Mount Diogenes, better known as the "Hanging Rock," near Woodend. It is lightly timbered, and rises abruptly from comparatively level country, though on the south-east side a rather sharp ridge forms a somewhat easy approach. Its height is recorded as 1,300 feet above sea-level, but, as its base is probably about 800 feet, its elevation above the plain would be only 500 feet. From its isolation, and being marked on the geological map of Victoria as volcanic, in the midst of a Silurian area, we had, when passing in the train, often expressed a wish to investigate its natural history.

The opportunity came in October last, when, along with another member of our Club, we arranged for a week-end in the district, and though the results of our visit hardly came up to our anticipations, still, as the mount is out of the track of the usual Club excursions, we thought that a few notes about the outing might prove interesting.

Leaving town by the afternoon train, Broadford, 47 miles, was reached about 5 o'clock, enabling us to have a short ramble before dark. The town is situated in hilly, picturesque country, the Sunday Creek, then a fair stream, cutting across the main (Sydney) road from east to west, and to some extent dividing the township into two portions. Looking north, the Tallarook Ranges stand boldly up only a few miles away, and cut off any more distant prospect in that direction. To the south-west was the wooded peak of Mount Piper. Rambling towards the paper mill—the principal industry of the place, large quantities of straw being turned into cardboard—at least six species of Psyllids were collected from the gum saplings along the road; then we turned towards the railway line, and in the enclosure found a few interesting flowers, among them the orchid *Caladenia caerulea*. Numerous branches of the eucalypts strewed the ground; these, on examination, proved to have been cut off by the longicorn beetle, *Scollobrotus westwoodi*. Next morning we were out betimes, and strolled over towards Broadhurst's Creek, the valley of which the railway follows from Wandong to near Broadford, and which junctions with the Sunday Creek near the paper mill.

After breakfast we started off for the mount, with the intention of making our way from it across country to Kilmore East, about seven miles, and picking up the evening train there. Keeping to the Melbourne road for about a mile, we then turned across the paddocks, principally used for grazing, for another mile, till we began to approach the mount. On a damp slope specimens of the somewhat rare orchid, *Pterostylis mutica*, and the singular little fern, *Ophioglossum vulgatum*, were secured, and, though our companion was very keen in his search under bark, stones, &c., insects proved very scarce, but numerous planarians were seen.

As we approached the mount, we noticed high up on its sides some bare rocks, which naturally we took to be granite, on account of the record on the geological map, but later found them, like the rest of the hill, to be of Silurian formation, though greatly hardened by heat. We now found that to reach the top of the mount it would be better to take advantage of the south-easterly ridge previously mentioned. When passing through a fine growth of the Golden Wattle, *Acacia pycnantha*, a rather rare fungus was noticed on the leaves, which has been identified for us by Mr. C. C. Brittlebank as *Phyllosticta phyllodiorum*, and, as there was only a single specimen in the herbarium of the pathologist's branch, we were able to supply a number of duplicates.

On the dry hillside we noticed a number of gum saplings whose bark had evidently been nibbled by rabbits. Higher up some white flowers were seen through the scrub, which, on our getting nearer, proved to be the Native Heath, *Epacris impressa*. A little further on we got on to the main ridge, and found an indistinct track leading up towards the summit. Here and there were small bushes of *Grevillea alpina* and *Acacia acinacca*, with *Dillwynia ericifolia*, var. *phylioides*, and other leguminous plants. About 150 feet from the top we left the bulk of the stunted gums behind, and found ourselves amongst what we had taken to be granite rocks, but which turned out to be exposures of Silurian, and thence to the top the hillside consisted of weathered fragments of Silurian in a loose, friable red soil. Here the Rock or Parsley Fern, *Cheilanthes tenuifolia*, grew luxuriantly. This fern, one of our prettiest in its native habitat, is the despair of most fern-growers. To grow it at home as we saw it here, in dry, loose soil, would soon result in death, while more liberal treatment generally has the same result. The other plant which seemed to share the mount with the Cheilanthes was the introduced *L'impérnel*.

The summit, which consisted of a particularly hard form of Silurian, in which were several quartz veins, and was not more than 20 yards across, was reached about noon, and

from it we had a splendid view all round of the lower country. The day was dull and cloudy—in fact, slight drifting showers at times obscured the view—but a fair number of land-marks could be made out. Due south the crest of the Big Hill above Wallan was just discernible; round towards the west was Macedon and the Camel's Hump; a little nearer at hand the Lancefield Mount William; then, about 40 miles away to the north-west, Mount Alexander, near Castlemaine, was picked up through a gap in nearer ranges. Mounts Koala and Tooborac stood up prominently to the north. The Tullarook Ranges blocked our view to the north-east; towards the east some of the peaks around Marysville were just visible, while Mount Disappointment and the Plenty Ranges, about 15 miles away to the south-east, completed the panorama.

A few stunted gums, probably a form of *E. amygdalina*, on the top afforded a little shelter while lunch was being disposed of. Here we noticed the butterflies *Delias harpalyce* and *Belenois java* flying above us, as also the day-moth *Agarista lewini*. Having spent as long as we could on the top, we made our way down the rocky ledges of the southern face of the hill. Here we found several interesting plants, such as the Mosquito Orchid, *Cyrtostylis reniformis*, *Asplenium flabellifolium* and *Grammitis rutæfolia*, two ferns so often found associated with the Cheilanthes. A veronica also, but not in flower, *V. perfoliata*, was fairly abundant, growing in the crevices of the rocks, and as we descended lower the sight of the day came in view, a magnificent growth of *Epacris impressa*, with flowers of the largest size and of the purest white. Its season was nearly over, but it was in sufficiently good condition as to draw forth exclamations of delight as we made our way through it. Here and there such orchids as *Glossodia major*, *Caladenia Patersonii*, *C. carneæ* (several varieties) gave variety to the scene. We would have liked to have tried what the western and northern slopes of the mount would have produced, but time was passing, and, as we did not know what obstacles might be between us and Kilmore East, where we were due at 5.30 p.m., we had to leave them for some future time.

Setting out in a south-easterly direction across the paddocks, the golden-yellow flowers of *Hibbertia obtusifolia* became a feature of our surroundings. Would it were a flower which could be gathered and taken home, for its size and its pleasing shade of colour make it one of the gems of the bush.

Passing on, a trap-door spider's tunnel was detected in a grassy bank. Presently we came to Broadhurst's Creek, with the railway line on the slope above. We struck the latter at about 42½ miles from town, and here a remarkable sight

was presented to us. The orchid which we considered to be *Pterostylis mutica* was growing in a dampish place in dozens, and many fine specimens were obtained for herbarium purposes. Stems with a dozen flowers were common, and one possessed no less than eighteen. Though one of the smallest of the greenhoods, in such numbers it became quite conspicuous. Associated with it was another orchid, *Microtis atrata*, also *Stackhousia linearifolia* and *Microseris Forsteri*, the latter very fine, and amply rewarding the seeker after its edible tubers. Other plants here were the singular depressed acacia, *A. tenuifolia*, and the so-called Native Hop, *Daviesia latifolia*, which was blooming very freely. We then kept along the railway line, but our results afterwards proved that we had struck it at the most interesting spot, for little of note was seen during the three miles to Kilmore East, where our walk ended.

Seeing that Mount Piper is not difficult of approach, it might form the objective of some future excursion, though, owing to its distance from town, it would require a whole day for the outing. Thinking our orchid was *P. mutica*, several specimens were sent to the National Herbarium, and to Dr. Rogers, of Adelaide, who immediately wrote, pronouncing it to be *P. cyanoccephala* of Fitzgerald, recorded from New South Wales and South Australia, but up to then unrecorded from Victoria. He states that it is separable from *P. mutica* by a difference in the appendage of the labellum, but Professor Ewart regards the difference as too indefinite on which to found a new species.

SWAMP-HAWK.—When visiting Phillip Island in November last, I found a nest with four young in it—or, rather, out of it, scattered round about the nest. It was noticeable that, while two of the birds were still in down, the other two were well advanced in feathering, and I considered that there was not less than a fortnight's difference between the ages of the birds. Three visits were paid, at weekly intervals, to the nest, finding the same relative difference on each occasion. This fact seems to me very interesting, as it raises the question, Do some birds, when incubating their eggs, start to lay again? or is there some other explanation? I have been informed by Mr. Le Souëf that the bird in question, the Swamp-hawk (Gould's Harrier), has been known in one instance to act as above, but with fatal results to the younger birds, for the elder fledglings ate them up. Mr. Kearnland tells me that in most birds of prey the female is the stronger and fiercer, and probably the smaller birds noted were the males.—J. GABRIEL.
10th March, 1913.

NOTES ON THE BREEDING OF ENGLISH NEWTS IN VICTORIA.

BY H. W. DAVEY, F.E.S.

(Read before the Field Naturalists' Club of Victoria, 10th March, 1913.)

NEWTS belong to a group of the animal kingdom very widely spread over Europe, North America, and Northern Asia, but are unrepresented in Australia, and thus perhaps a few notes about them may be of interest. Along with frogs, toads, and salamanders, they are placed in the class Amphibia apart from reptiles, and may be defined as cold-blooded vertebrates, usually furnished with external gills at the commencement of their lives, but before becoming adult passing through a stage during which the gills are exchanged for lungs, although there are exceptions—viz., the Proteidæ and Sirenidæ, both of which families retain the external gills permanently throughout their lives. The young newt develops legs in a manner somewhat similar to the frog tadpole, but always retains the tail, which, after the adult stage is reached, varies in shape according to the season. In the breeding season newts are always of brighter hues than at other times, and in some species the males at this time develop very fine dorsal crests, the tail in both sexes becomes very highly compressed, being formed for rapid swimming. The food of adult English newts consists largely of tadpoles of the common frog and the larvæ of various aquatic insects.

Four years ago a friend, returning from a trip to England, kindly brought out for me four specimens of the large English newt, *Molge cristata*—three males and one female. Two of the males escaped, and I was left with just a pair; these I tried to breed from, but was unsuccessful. Every spring I thought they would breed, as the male developed a very fine crest, better than I had ever observed in England; the male also paid much attention to the female. But I seemed doomed to be disappointed until this spring.

The female commenced egg-laying on the 1st of last November, the eggs being merely gummed to water plants, the leaves not being folded up, as is often said in books on natural history. The eggs are laid singly, and are usually placed in the axil of the leaf. The embryo is quite white, and is surrounded by a glairy substance, such as are the eggs of frogs and toads. On the 6th of November the embryo was elongated, with a knob at one end, and pure white all over. By the 10th November two embryos had movement, turning completely from end to end in egg, and pigmentation in longitudinal lines on back could be observed. On the 14th November two larvæ emerged during the afternoon. Egg-laying was still being carried on by the female, the last eggs being laid on 20th November, six eggs

being laid during that night, and by the 24th November more larvæ were hatching out.

Before leaving the eggs, four longitudinal lines of black spots (pigment), gills, and eyes were plainly visible; larvæ continued hatching out until the 30th November. The first hatched larvæ were by this time becoming quite strong, and could be observed hanging on to the side of the vessel that held them by means of their claspers, mostly about two inches beneath the surface of water. All larvæ when newly hatched lay on their sides for a few days, the same as newly hatched fish do. The front legs make their appearance very soon after hatching; in this they differ very much from the tadpoles of frogs, as these attain to a good development before legs appear, and then it is always the hind legs that appear first, whereas in the newts the front legs appear first, and are developed externally, whereas in frogs the front legs are developed beneath the skin and then burst out, so that it often happens that a frog tadpole is seen swimming about with three well-developed legs, and a little later the fourth leg will force its way out, after which the tail is rapidly absorbed. On the 23rd December hind legs were appearing in the larvæ, and by the 1st January some of the larvæ were two inches long, and by the 19th January a number of them could eat very small worms.

At this time it was very noticeable the great difference in sizes of larvæ, some being over two inches long, while others were barely half an inch. On 20th January larvæ, although still having large branching gills, commenced rising for air like adult newts, showing that the lungs were developing. By the 1st February their bodies were becoming darker and rougher, and their ventral surfaces becoming yellow, the gills becoming shorter and more of the adult look about them. A tail of one of the larvæ that was bitten clean off on the 1st January by a larger larva was completely replaced by the 1st February. By the 9th February some of the larvæ were just miniatures of the adults, with the exception of showing stumps of gills not quite absorbed; they now eat freely of small worms, and rising frequently to surface of water for air, having quite lost their larval appearance, the tail having narrowed considerably vertically and thickened laterally. By the 14th February five larvæ had matured and left the water.

During their larval stage newts are extremely interesting creatures, and the amount of food they consume is wonderful; mosquito larvæ was their only food, and, although I had a good many sources of supply, it was not always easy to obtain sufficient for their requirements. They are absolutely the best consumers of "wrigglers" that I have as yet come across.

At time of writing this (25th February) seven larvæ have matured, but others will be some weeks yet before maturing.

THE NOMENCLATURE OF AUSTRALIAN BIRDS.

AN "Official Check-list of the Birds of Australia" has just been issued by the Royal Australasian Ornithologists' Union, and represents an enormous amount of painstaking work. So long ago as 1903 a committee of the Union was appointed to prepare a check-list which would be authoritative as regards Australian birds. Naturally the work was slow; many difficulties were met with, and careful consideration had to be given to the many questions arising as the work went on, the ever-recurring question of priority of naming not being the least. In the report which prefaces the list the method of procedure, and reasons for certain changes, are fully set out, and it is gratifying to find the committee so unanimous in condemning the tendency of some recent writers to found species and sub-species on the most trivial differences, while the use of trinomials is rejected as tending rather to confusion than simplicity, and likely to turn the bird-lover from his hobby. The list extends to 88 pages (7×4 inches of type), enumerating 751 species and 94 sub-species, 10 of the latter being secondary sub-species, each bird being given a vernacular name. In the main Gould's classification, as amended by the late Dr. Bowdler Sharpe, has been followed, with such alterations as have become necessary by later knowledge of the subject. The list starts with the Emu, *Dromaius novæ-hollandiæ*, Lath., and ends with the Lesser White-backed Magpie of Tasmania, *Gymnorhina organicum*, Gld. With each bird is given the number of the page in Sharpe's "Hand-list of Birds" where further references will be found regarding it. The range through the different Australian States and adjacent islands is also given. In addition to the main list, a provisional list of 78 birds is given, which may later on, if considered advisable, be admitted as additional names on the Australian list, and a second appendix contains the names of the birds peculiar to Lord Howe and Norfolk Islands. The index contains the name of every bird listed, but we think a table of orders and families, showing the classification adopted, would have been a valuable addition. However, the task has been a great one, and it is to be hoped that, though every ornithologist may not agree with every determination, so far as Australian workers are concerned it will be adopted as a whole, and thus become the standard of nomenclature for our Australian species. Perhaps it may not be out of place here to suggest that before the name of any new species which may come to light in future years is published by an author, it should have been submitted to and approved of by the "Check-list Committee," and when this system is adopted for all branches of science there will be some hope of finality in naming.

T H E

Field Naturalists' Club of Victoria.

FOUNDED MAY, 1880.

MEMBERS,

31st MARCH, 1913

(With Date of Election and particulars of Branch of Study).

HONORARY MEMBERS.

- Oct. 1885 † ATKINSON, E. D., Sulphur Creek, Tasmania.
July 1883 BROUN, CAPTAIN T., Howick, N.Z.
Aug. 1884 FINSCH, DR. OTTO, Germany.
Sep. 1889 † LEGGE, LIEUT.-COL. W. V., R.A., F.Z.S., M.B.O.U.,
Melbourne.
Feb. 1893 * † LUCAS, A. H. S., M.A., B.Sc., Grammar School, Sydney,
N.S.W.
Aug. 1882 RAMSAY, DR. E. P., F.R.S.E., &c., Sydney, N.S.W.

LIFE MEMBERS.

- Sep. 1884 BAGE, MRS. EDWARD, "Cranford," Fulton-street, E. St. Kilda.
Sep. 1882 PATEV, B. R., Esq., Premier Buildings, Collins-street, M.

ORDINARY MEMBERS.

- April 1911 Abbott, S. B., Mines Department, Melbourne
Dec. 1911 Archer, A. O., 273 Royal-parade, Royal Park, Parkville
Aug. 1885 Andrews, H., 206-208 Flinders-lane, Melbourne
Oct. 1909 Anjou, Hy., Neerim-road, Murrumbeena
Aug. 1906 Armitage, Jas. A., 510 Station-street, N. Carlton
April 1906 * † Armitage, R. W., M.Sc., Dipl. Ed., F.G.S.,
F.R.G.S., 441 Canning-street, Carlton ... Biology, Geol.
June 1906 † Audas, J. W., F.L.S., F.R.M.S., National
Herbarium, South Yarra Botany
Feb. 1904 † Bage, Miss F., M.Sc., F.L.S., "Cranford,"
Fulton-st., St. Kilda General Biol.
June 1906 Bainbridge, J. W., Crown Lands Dept., M. ... Botany
Oct. 1912 Baird, G., "Purleigh," Garvoc
Aug. 1889 † Baker, H. H., 78 Swanston-street, Melbourne Microscopy
May 1880 o Bale, W. M., F.R.M.S., Walpole-street, Kew Hydroids
May 1880 o * † Barnard, F. G. A., 49 High-street, Kew Ent., Bot. (Ferns)
Jan. 1906 Barnett, Miss A. M., P.O., Newport
Dec. 1909 Barr, Jas., 39 Queen-street, Melbourne
Sept. 1899 * † Barrett, C. L., Herald Office, Melbourne ... Orn. & Reptilia
May 1906 Bennett, W. J., "Riverside," Davidson-st., South Yarra
May 1880 o * † Best, D., 291 Little Collins-street, M. ... Ent. (Col.)

- Nov. 1904 Booth, J., M.C.E., B.Sc., "The Gables,"
Berkeley-street, Hawthorn Amphibia
- May 1905 Booth, Miss E. S., "Amergate," Wallace-avenue,
Toorak
- June 1911 † Brittlebank, C. C., Government Vegetable Path-
ologist's Department, Melbourne Ent., Botany
- Dec. 1909 Bury, Miss E., "Verona," Argyle-street, St. Kilda
- Dec. 1906 † Campbell, A. G., "Fernside Orchard," Pomonal,
vid Stawell Orn., Oology
- Mar. 1909 † Carter, T., M.B.O.U., Broome Hill, W. Aust. Ornithology
- Dec. 1902 Cayley, F. J., Werribee
- May 1902 *† Chapman, F., A.L.S., F.R.M.S., Nat. Museum,
Melbourne Geol., Palaeon.
- July 1902 Clark, Alister, "Glenara," Bulla Ornithology
- Dec. 1908 Clarke, A. Rutter, Orrong-road, Toorak
- Feb. 1911 Code, W. J., Heathcote
- July 1882 * Coghill, G., 79 Swanston-street, Melbourne ... Botany
- Nov. 1906 † Cole, C. F., 13 Williams-street, Glenferrie ... Ornithology
- Feb. 1913 Conigrave, C. P., *Argus* Office, Melbourne
- Nov. 1902 Cowle, Miss L., c/o Mr. Priest, Devonport W.,
Tasmania
- Feb. 1910 Crawford, Miss K., 32 Motherwell-st., Hawksburn
- Dec. 1910 Cronin, John, Botanic Gardens, Melbourne
- May 1912 Cudmore, F., Murphy-street, South Yarra
- Feb. 1901 D'Alton, St. Eloy, C.E., Dimboola Botany
- Feb. 1910 Dainty, Miss F., St. George's-road, Malvern
- Dec. 1892 Danks, A. T., Bourke-street, Melbourne
- July 1902 † Davey, H. W., F.E.S., Keera-st., Geelong West
- June 1909 Davis, Miss M., 337 Weston-street, Brunswick
- Oct. 1911 Davis, D., Weston-street, Brunswick
- June 1912 Dawes, C. S., 20 Glover-street, South Melbourne
- Nov. 1911 Dines, Miss N., Church M. Soc., Dummagudem,
S. India
- Aug. 1911 † Dodd, F. P., Kuranda, North Queensland Entomology
- May 1880 o * Dixon, J. E., 50 Swan-street, Richmond Ent. (Col. & Lep.)
- Nov. 1911 Dunn, E. J., F.G.S., Pakington-street, Kew
- May 1904 Edmondson, C. H., 75 Riversdale-rd., Hawthorn
- Dec. 1901 Edmondson, Mrs. C. H., Riversdale-rd., Hawthorn
- April 1906 * † Ewart, Professor A. J., D.Sc., Ph.D., F.L.S.,
National Herbarium, South Yarra .. Botany
- Sept. 1907 Farr, W. H., Flinders
- May 1890 * † Fielder, Rev. W., F.R.M.S., "Croft," Orrong-
road, Armadale Micro. Biology
- May 1911 Firth, J., Briagolong
- May 1880 o * † French, C., F.E.S., Anderson-rd., Hawthorn Entomology
- July 1883 * † French, C., jun., Department of Agriculture,
Entomological Branch, Melbourne ... Entomology
- Aug. 1885 * † Frost, C., F.L.S., Mt. Victor-road, Kew ... Reptilia
- Mar. 1901 Fullard, A. F., Barker's-road, Hawthorn
- July 1883 * † Gabriel, J., Walmer-street, Kew ... Oology
- June 1900 † Gabriel, C. J., 293 Victoria-st., Alphontford ... Marine Conc.
- July 1908 Gabriel, J. E., Sale
- Nov. 1889 Gates, W. F., M.A., "Cullymont," Selwyn-rd.,
Canterbury
- Oct. 1880 * † Gatliff, J. H., Clowes-street, South Yarra .. Marine Conc.
- Jan. 1911 Gay, W., Dookie College
- Aug. 1911 Gill, A. J., State School, Cockatoo Creek
- Feb. 1912 Gladman, F. E., Pt. Nepean-road, Elsternwick
- June 1902 † Goudie, D., Poath-road, Murrumbeena ... Ent. (Lep.)
- May 1902 † Goudie, J. C., Sea Lake, Victoria ... Ornith., Ent.

- Dec. 1906 Gray, O., Wedderburn, Victoria
 Dec. 1909 Greenwood, Rev. A. J., Linton
 Jan. 1901 Greenwood, G. F., "Garrell," Glen Eira-rd., Caul.
 July 1909 *Haase, J. F., 367A Little Collins-st., Melbourne
 June 1910 Haig, H. G., Nicholson-street, Fitzroy
 June 1888 *Hall, T. S., M.A., D.Sc., University, Carlton Gen. Bio., Geo. (Grapt.)
- Dec. 1905 *Hamilton, Jas. T., F.L.S., Heidelberg-road, Ivanhoe Botany, Geol.
 Sept. 1887 Hammet, E. R., State School, Glen Alvie
 Sept. 1909 Handley, Edgar, 74 Park-st., North Fitzroy
 Nov. 1901 *Hardy, A. D., F.L.S., F.R.M.S., Forests Dept., Melbourne } Bot. (Freshwtr. Algae)
- June 1912 Harry, W. L. C., Mentone
 Aug. 1887 Hart, T. S., M.A., School of Mines, Ballarat Geology, Bot.
 July 1899 Hartnell, W. A., "Irrewarra," Burke-road, Camberwell
- Dec. 1905 *Harvey, J. H., A.R.I.V.A., 128 Powlett-st., East Melbourne
 June 1910 Helms, Otto, State School, Laver's Hill
 Jan. 1884 *Hill, G. R., "Glenrowan," Dandenong-road, Windsor
- Aug. 1909 Hill, G. F., Darwin, Northern Territory ... Ornithology
 April 1901 *Hill, J. A., Kewell, *via* Murtoa ... Ent., Orn.
 Mar. 1907 Horner, Miss L., State School, Castlemaine
 May 1910 Horner, H. E., Tintern-avenue, Toorak
 Sept. 1910 Ingle, Daniel, Healesville
 Aug. 1911 James, A., Continuation School, Melbourne
 April 1909 *Jarvis, E., Dept. Agriculture, Brisbane ... Entomology
 Jan. 1905 Jeffery, H. W., "Hazeldene," Cochrane-street, N. Brighton
- June 1910 Johnston, J., State Plantation, Creswick ... Botany
 Oct. 1911 Joshua, E. C., Munroë-street, Armadale
 April 1904 Kaufmann, J. C., LL.D., 21 Kooyong Koot-road, Hawthorn ... Pond Life, Mic.
- Feb. 1886 *Keartland, G. A., Age Office, Collins-street, Melbourne ... Ornith., Oology
 July 1911 Keble, R. A., Geological Survey Office, Melb.
 Feb. 1907 Kellock, C. F., Sloyd Centre, Castlemaine
 July 1908 *Kelly, Reginald, Healesville ... Botany
 Feb. 1906 Keppel, Miss K., Marysville
 Mar. 1888 *Kershaw, J. A., F.E.S., National Museum, M. Zoology.
 July 1893 *Kitson, A. E., F.G.S., c/o J. S. Kitson, Continuation School, Melbourne ... Geology
- June 1903 Kitson, J. S., Continuation School, Melbourne ... Geology
 Feb. 1912 Lambie, Jas., Glenferrie House, Glenferrie
 Dec. 1902 *Leach, J. A., D.Sc., Education Dept., M. ... Biology, Geol.
 May 1903 Lees, E. H., C.E., F.R.A.S., Fairhaven, Mallacoota
 Oct. 1905 *Le Souëf, D., C.M.Z.S., Royal Park, Parkville ... Ornith., Oology
- Aug. 1907 Lindsay, J., State School, Wannon
 Feb. 1902 Luly, W. H., Spring-street, Preston
 April 1888 *Lyell, G., jun., F.E.S., Gisborne ... Ent. (Lep.)
 June 1887 *Maegillivray, Dr. W., Broken Hill, N.S.W. Ornith., Oology
 Jan. 1907 Mackeddie, Dr. J. F., Collins-street, Melbourne
 June 1911 *Mackintosh, W. G., 110 Spencer-st., Melb. ... Microscopy
 Dec. 1902 *Madden, Hon. Sir F., M.L.A., Studley Park, Kew
 Jan. 1908 *Mahony, D. J., M.Sc., Dept. of Mines, M. ... Geology
 Nov. 1904 *Maplestone, C. M., Eltham ... Polyzoa (recent, fossil)
 Feb. 1910 Marshall, J. E., 14 South-terrace, Clifton Hill [fossil]

Nov.	1895	*† Mattingley, A. H. E., C. M. Z. S., 74 Glenferrie-				
		road, Kew	...	...	...	Ornithology
May	1885	† McAlpine, D., Mathoura-road, Toorak				Botany
July	1894	* McCaw, W. J., 7 Liddiard-street, Glenferrie				Zoology
July	1911	McGowan, W., City Park, Launceston				
June	1904	* McLennan, J. P., Agric. High School, Warragul				Botany
Aug.	1899	McNab, L. K., "Braeside," Waiora-rd., Caulfield				
Dec.	1910	Mesley, A., Agricultural College, Dookie				
July	1911	Meyer, L. D., Milroy-st., North Brighton				
May	1912	Mitchell, Rev. A., Orrong-road, Elsternwick				
Aug.	1912	Mitchell, Miss M., "Glenferrie House," Glenferrie				
June	1911	Mitchell, R., Manningham-street, Parkville				
June	1904	Montgomery, Miss M. H., State Schl., Clifton Hill				
July	1899	Morgan, W. J., 11 Robb-street, Moonee Ponds				
Nov.	1884	Morrison, Dr. A., 427 Victoria-parade, Melb.	...			Botany
Oct.	1895	Mowling, G., "Athol," Auburn-road, Hawthorn				
Oct.	1911	Nethercote, Miss G., Callantina-road, Glenferrie				
April	1903	+ Nicholls, E. B., 164 Victoria-st., North M.	...			Ornithology
Dec.	1908	*† O'Donoghue, J. G., 34 Lonsdale-st., Melb.	...			Botany, Geol.
Dec.	1904	Oke, Chas., 56 Chaucer-street, St. Kilda				Entomology
May	1902	O'Neil, W. J., Department of Lands, Melbourne				
Feb.	1911	Parsons, Frederick, State School, Lara				
Mar.	1910	Petherick, E. A., F.L.S., F.R.G.S., 254 Albert-				
		street, East Melbourne				
May	1880	o*† Pitcher, F., Botanical Gardens, Melbourne	...			Botany
Sept.	1901	† Pritchard, G. B., D.Sc., F.G.S., Kooyong Koot-				
		road, Hawthorn	...	...	...	Geology, Conc.
May	1892	Quiney, H., Mortlake	...	...	...	Ornithology
May	1909	*† Raff, Miss J., M.Sc., 169 Royal-parade, Parkville				Botany
May	1905	Randall, Miss M., "Litchfield," Primrose-street,				
		Essendon				
April	1909	Ritchie, Miss E. M., Hotham-st., Balaclava				
Aug.	1908	Robertson, J. L., M.A., 35 Hutcheson-st., Moonee				
		Ponds				
Oct.	1911	Robinson, C. A., Lands Office, Sale				
May	1912	Robinson, T. A., Armidale, via Sale				
Jan.	1903	* Roger, W. H. A., 19 Wattletree-rd., Armadale				Ent. (Lep.)
May	1904	Rollo, Miss J., 65 Tivoli-road, South Yarra				
Nov.	1910	Rosenhain, Oscar, 482-484 Collins-street, Melb.				
Mar.	1899	Ross, J. Andrews, Rochester				
Jan.	1910	Ryan, Dr. E., Collins-street, Melbourne				
Jan.	1910	Ryan, Dr. T. F., Nhill				
Jan.	1909	Scott, Alex. L., 27 Evelina-road, Toorak				Geology
Nov.	1885	Scott, W., 54 Fletcher-street, Essendon				
July	1885	*† Scarle, J., 274 Collins-street, Melbourne				Entomostraca
June	1912	Selby, A. D., Pakenham				
Oct.	1909	Semple, Dr. W. H., Kilmore				
Sept.	1910	Shaw, Dr. A. E., F.E.S., Healesville				Entomology
May	1889	*† Shephard, J., Clarke-st., South Melbourne	...			Pond life
Sept.	1904	Shephard, Miss W., Clarke-street, S. Melbourne				
July	1884	* Simson, Mrs. J., "Trawalla," Toorak				
May	1905	Skeats, Professor E. W., D.Sc., Univ., Carlton	...			Geology
May	1880	o† Sloane, T. G., "Moorilla," Young, N.S.W.	...			Ent. (Col.)
May	1902	Smith, A. J., Port Albert				
July	1910	Smith, Sydney, 45 Hoddle-street, Richmond				
Mar.	1913	Solomon, Mrs., Weston-street, Brunswick				
Dec.	1901	Somers, Dr. J., Edgeworth, Mornington				
Jan.	1903	Spark, J. M., Harding-street, Surrey Hills				
Aug.	1887	*† Spencer, Professor W. Baldwin, C.M.G., D.Sc.,				
		M.A., F.R.S., University, Carlton				Biol., Zoology

- May 1910 Spencer, W. G., 42 Ferguson-street, Williamstown
 Feb. 1882 †Spry, F., Heather-street, South Melbourne ... Entomology
 Nov. 1908 †St. John, P. R. H., Mason-street, South Yarra Botany
 Nov. 1911 Stanton, B. L., Princess-street, Kew
 Jan. 1908 Stephen, W. J., 32 Robinson's-road, Hawthorn
 Nov. 1880 Stickland, J., Latrobe-street, Melbourne ... Pond life
 July 1885 * †Stickland, W., Latrobe-street, Melbourne ... Pond life
 July 1911 Stout, C., High School, Mildura.
 Nov. 1900 * †Sutton, Dr. C. S., Rathdown-street, N. Carlton Botany
 May 1910 Sutton, Dr. Harvey, Education Dept., Melbourne
 July 1886 * †Sweet, G., F.G.S., "The Close," Wilson-st.,
 Brunswick Geology
 Jan. 1911 †Sweet, Miss G., D.Sc., Melbourne University
 July 1910 Templeton, Mrs. Carrie, George-street, E.M.
 Dec. 1892 Thiele, A. F., Doncaster
 Oct. 1909 Thiele, E. F., Doncaster Ornithology
 Aug. 1910 Thomas, F. J., Beach Forest
 Feb. 1904 Thomson, Dr. J. R. M., Violet Town
 Sept. 1900 †Thorn, W., Mines Department, Melbourne
 April 1883 * †Topp, C. A., M.A., LL.B., I.S.O., Royal-
 crescent, Armadale Botany
 Aug. 1907 †Tovey, J. R., National Herbarium, South Yarra Botany
 Sept. 1910 Traill, Mrs. W. J., Beaconsfield-parade, Albert Park
 June 1904 Turner, Miss E. J., "The Grange," Domain-rd.,
 South Yarra
 Jan. 1910 Twyford, J., Noel-street, Ivanhoe Microscopy
 Nov. 1891 Walker, J. B., Mackillop-street, Melbourne
 Jan. 1908 Wallace, Rev. H., Violet Town
 June 1904 †Waterhouse, G. A., B.Sc., F.E.S., Moore-street,
 Sydney, N.S.W. Ent. (Lep.)
 Sept. 1908 *Waters, C., Continuation School, Melbourne
 Aug. 1911 Watson, F., Madeline-street, Carlton
 Nov. 1901 †Weindorfer, G., "Roland Lea," Kindred, Tas. Botany
 May 1906 Wettenhall, Dr. R., Toorak-road, Toorak
 Sept. 1898 Wilcox, J., 51 Brinsley-road, E. Camberwell
 Jan. 1901 †Williamson, H. B., Linton Botany
 Sept. 1907 Wilson, H. W., Chelsea-street, Brighton ... Pond life, Geol.
 July 1904 Wilson, J., Moorabbin Pharmacy, Cheltenham
 Aug. 1912 Wise, Miss M. I., Foster-street, Sale
 May 1880 o* †Wisewould, F., Imperial Chambers, 408
 Collins-street, Melbourne
 July 1902 Wisewould, Miss G., Seymour-road, Elsternwick
 Oct. 1898 Wollen, A., c/o Tiloch and Co., Kent-street,
 Sydney Orn., Ent.
 Nov. 1911 Wright, H. B., 172 William-street, Melbourne
 Mar. 1908 Wrigley, Miss E., Kent-street, Ascot Vale.
 April 1912 Zumstein, W., Wartook

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The Geelong Naturalist (Geelong Field Naturalists' Club).

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- Publications of the Department of Agriculture.
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- Papers and Proceedings of Royal Society of Tasmania.
The Tasmanian Naturalist (Tasmanian Field Naturalists' Club, Hobart).

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- Records of the Western Australian Museum, Perth.
Journal of the West Australian Natural History and Science Society, Perth.

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- Transactions of the New Zealand Institute, Wellington.
Records of the Canterbury Museum, Christchurch.

GREAT BRITAIN—

- The Selborne Magazine : the organ of the Selborne Society, London.
Knowledge (London).
Country-side Monthly (London).
Bulletin of Miscellaneous Information, Royal Botanic Gardens, Kew
United Empire : the Journal of the Royal Colonial Institute, London.
The Austral Avian Record (London).
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- Mitteilungen aus dem Naturhistorischen Museum, Hamburg.
Bulletin of the Geological Institute, University of Upsala, Sweden.

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Pomona Journal of Entomology, Pomona College, Claremont, Cal.
Publications of the Lloyd Library, Cincinnati, O.
Proceedings Hawaiian Entomological Society.

SOUTH AMERICA—

- Revista do Museo Paulista, S. Paulo, Brazil.

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